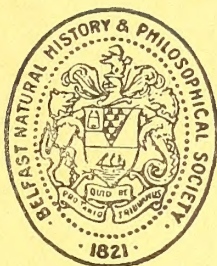








4.17.



**BELFAST NATURAL HISTORY  
and PHILOSOPHICAL SOCIETY**

**141st-143rd SESSIONS**

---

**PROCEEDINGS**  
*and*  
**REPORTS**

---

Sessions  
1961/62-1963/64

Second Series  
Volume 7

*Price*       -       -       -       *Ten Shillings*



BELFAST NATURAL HISTORY  
and PHILOSOPHICAL SOCIETY

1821-1822 SESSION

PROCEEDINGS

and

REPORTS

Second Series  
Volume 1

Ten Shillings

Price





**BELFAST NATURAL HISTORY  
and PHILOSOPHICAL SOCIETY**

**141st-143rd SESSIONS**

---

**PROCEEDINGS**  
*and*  
**REPORTS**

---

**Sessions  
1961/62-1963/64**

**Second Series  
Volume 7**

**BELFAST:  
PRINTED BY THE NORTHERN WHIG LTD., WARING STREET.**

---

**1965**



# BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY

[ESTABLISHED 1821.]

---

## CONSTITUTION

The membership of the Society consists of Shareholders, Annual Subscribers and Honorary Members.

Shareholders holding more than two shares are not liable for an annual subscription, but shareholders of two shares pay an annual subscription of five shillings, and holders of one pay ten shillings.

In 1914 a new class of membership was created including persons of either sex, to be elected under the bye-laws of the Society, and admitted by the Council on payment of ten shillings per annum. Such members have all the privileges of the Society, and take part in any business of the Society not affecting the ownership of the property. In 1917 an Archaeological Section was established. Persons wishing to join the Section must be members of the Society and pay an additional minimum subscription of five shillings per annum.

A general meeting of Shareholders and Members is held annually to receive the Report of the Council and the Statement of Accounts for the preceding year ending 31st October, to elect members of Council, to replace those retiring by rotation or for other reasons and to transact any other business incidental to an Annual Meeting.

The Council elect from among their own number the President and other officers of the Society.

Each member has the right of personal attendance at the ordinary lectures of the Society, and the privilege of introducing friends for admission to such.

Any further information required may be obtained from the Hon. Secretary, 7 College Square North, Belfast, 1.



# BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY

---

## Officers and Council of Management

---

### *President:*

JOHN GRANT.

### *Council:*

PROFESSOR J. C. BECKETT, M.A., M.R.I.A.

VERY REV. R. S. BREENE, M.A., LL.D.

R. W. CARLISLE.

MRS. M. A. K. GARNER.

LT.-COL. J. R. H. GREEVES, T.D., B.SC., A.M.I.E.E.

HUGH W. HEARNDEN.

J. F. LARMOR.

W. ERSKINE LINTON, F.R.G.S.

J. E. SAYERS, D.Lit.

J. W. VITTY, M.A.

W. GORDON WHEELER, M.A.

### *Hon. Editor of Proceedings:*

J. W. VITTY, M.A.

### *Hon. Librarian:*

W. GORDON WHEELER, M.A.

### *Hon. Treasurer:*

LT.-COL. J. R. H. GREEVES, T.D., B.SC., A.M.I.E.E.

### *Hon. Secretary:*

LT.-COL. J. R. H. GREEVES, T.D., B.SC., A.M.I.E.E.



## CONTENTS

---

Crawford, Ronald H.—Design and the Irish Linen Industry .. .. .	5
Wilson, Harold E.—Rise and Decline of the Iron Ore and Bauxite Industry of Co. Antrim .. .. .	14
McClelland, Aiken—Thomas Ledlie Birch, United Irishman .. .. .	24
Medawar, P. B.—D'Arcy Thompson and the Problem of Form .. .. .	36
Beckett, J. C.—Irish-Scottish Relations in the 17th Century .. .. .	38
Edwards, T. K.—The Copeland Bird Observatory .. .. .	50



13th March, 1962.

## DESIGN AND THE IRISH LINEN INDUSTRY

RONALD H. CRAWFORD

I am indeed glad to have this opportunity of saying a few words to you to-night on the subject of design in the Linen Industry. This with two objectives; Firstly to give you, if I can, some idea of the limitations which we suffer and secondly—having accepted certain limitations I should like to try to sketch in a few ideas of what more the Trade could do than it is doing at present.

What is the Linen Industry composed of? It is an extraordinary complex assortment of about 100 or more firms all doing a pretty wide variety of things. We have Flax Merchants, Spinners, Weavers, Finishers, i.e., Bleaching Dyeing and Mangling and so on and finally Merchanting Warehouses. Straddling all these are some half-a-dozen large composite houses such as Ewatts and Ulster Weaving Co., who do all these different processes in what we call vertical organisations. But in spite of all this complexity the whole Industry is a relatively small one; In total spindles and looms it is not as large as a single group in the Lancashire Cotton Industry such as Joshua Hoyles.

The Linen Industry then is not only a small complex industry but because of the nature of the fibre we use it is of necessity very much a craft Industry. The various processes of manufacture do not lend themselves easily to high speed working or to automation in more than a few simple forms.

Now the prime producing sections of the Industry, such as spinning have little scope for Design and it is really only at the Merchant Warehouse stage that Design begins to play an important part.

A few minutes ago I mentioned limitations.

You know there are many critics of the Linen Industry—perhaps more at home even than abroad—who are ever ready to criticise the Industry for being backward in ideas and there is never a shortage of people who say "Why don't you do this?" and "why don't you do that?"

Before—so to speak—joining these critics I should like to defend these so-called stick-in-the-muds for a moment or two?

One of Linen's greatest attributes is that, in its bleached form, it is, and will remain, the whitest of all fabrics. While this, as I say, is a great attribute and a good selling point to all those people in the world who want a pure white fabric yet it has militated to a certain extent against the progress towards exciting design.

Another handicap in the search for better design is that, in the Weaving section of the Industry, a good deal of capital is invested in complicated and expensive Jacquard Looms.

Here may I interject a side note? It is quite extraordinary that Spinning and Weaving are two processes of manufacture which have changed very little from the original method when they were invented. The power driven spinning frames and jennys, and the application of power to traditional hand looms, did little to alter the basic principles involved; it was only with the invention of extruded man-made fibres that the "barrier" was really broken. To describe extruded man-made fibres fully would require a separate lecture! Sufficient for purposes of this paper to explain that all man-made fibres are imitations of natural fibres. They are synthetic substances—either regenerated cellulose or pure chemicals—extruded through very fine holes and coagulated into filaments something similar to what is done by the silk worm and spider. These synthetic fibres vary in their properties such as absorbency, warmth, crease-resistance and so on. And so to return to the thread of what I was saying:

Although it is the responsibility of those "nearest the firing line" to organise new ideas and designs and market them there are certain processes such as Damask weaving that take place "further back along the line" and so it might be well, at this stage, to have a look at the "tools for the job" and get some idea of what these limitations are.

What processes are available to us?

1. **Spinning**      Knobbly yarns or dyed yarns.
2. **Weaving**      (a) Plain weave—for printing and dyeing,  
                          (b) Dobby weave—such as huckaback, diaper, dice and small repeats  
                               —all permutations known,  
                          (c) Jacquard or Damask,  
                               All white or warp one colour weft the other.  
                               Tartan and blended effects.
3. **Dyeing**          Solid colour or cross dyed, i.e., different yarns take up dye—Viscose and acetate.
4. **Printing**        (a) Roller and variations,  
                          (b) Screen—describe—
5. **Embroidery**    (a) Hand,  
                          (b) Single needle,  
                          (c) Multiple, needle Swiss, Schiffli, etc.  
                               —describe/and limitations of each.

Of these five groups only three have much scope, viz.,  
                          Jacquard Weaving,  
                          Printing,  
                          Embroidery.

At this point I would like to show a few slides to explain—very briefly—how these processes work.

**Slides:**

1. A Jacquard Loom.
2. A Jacquard Loom—Close up.
3. A Jacquard Loom—Card and Paint.
4. Roller Printing Frame.
5. Screen Printing Frame.
6. Screen Printing Frame—Close up of wiping.
7. Single needle embroidery.
8. Swiss embroidery frame.

These, then, are the tools at our disposal. How can we use them to the best advantage?

First I must sound a note of warning, particularly to our industrial interests. Ever since the Industrial Revolution we in Britain have built up a very highly skilled technical know-how of manufacturing. Such industries as Carpet Manufacture, Jacquard Damask and Brocade types of weaving and all forms of Printing of fabrics up to 15 or 16 colour prints have been developed after many years of effort. If there is too strong a swing towards simple block designs and colour we then lose our superiority over those countries and industries who have not got our high



degree of technical ability and who, because of cheaper and less skilled labour conditions, can turn out these same simple effects with ease and beat us in the World's Markets.

So much for what we do, how we do it and the limitations. What can we do for the future?

If you are an artist you are free of course to paint such pictures as you like; if the public likes them and buys them then the artist can live in a big house on Hampstead Heath and endorse fat cheques. If the public doesn't like them the artist retires to a garret in a Paris slum and lives on a sack of beans. He can choose. But we in Industry do not have this wide choice. Our job is to produce consumer goods that will please the market or at least a large part of the available market and do this job as economically and profitably as possible.

The problem, then is "what does the market want?" and the corollary "what are we doing about filling these wants?"

What are the basic problems facing the Linen Trade?

Fifty years ago British Textiles, Linen and Cotton and Wool pretty well had the World's Markets at their feet with few competitors. Few of our critics to-day realise just how much conditions have changed in these fifty years.

**Firstly**, many countries, which were under-developed in 1910 such as India, Brazil, and the Argentine—to name only a few—are to-day making textiles AND making them very well AND making them very cheaply.

**Secondly**. We have the "invasion" of all the man-made fibres such as Rayon, Nylon, Terylene, and a thousand and one others. All these eat into our available markets.

**Thirdly**. There is an enormous change in the order of priorities in the average home. In my grandmother's time linen was in the "Top Ten." She and her friends took pleasure in showing off their linens, the fine hand stitching and embroidery and the lovely smooth damasks and cool sheets. They stroked them and purred over them.

But to-day T.V., tape recorders, long-playing records, holidays abroad, colour photography, and home cines, etc., etc., are all high priorities in the family budget and things like new sheets, pillowcases, and table cloths, are a long way down the list.

To deal with these three very briefly:

1. Other countries making their own. Everyone wants to take in washing and no one wants to give it out. There is a danger that if countries such as Australia and New Zealand, producing raw materials such as wool and food stuffs, now start manufacturing consumer goods then they must not be surprised if their customer countries such as Japan—which is a highly developed and densely populated industrial country—lose interest in buying prime products from them on the age-old argument "you can't muscle in on my racket."

Not being a trained chemist, I cannot say much about the technical details of the production of man-made fabrics except to say that they have both good points and failings.

Some of the good points are:—

1. Cheapness and accessibility of raw material.  
Ordinary, everyday chemicals in plentiful supply.
2. Ease of control during manufacture. Smooth and not tangled up like so many natural fibres.
3. By varying the ingredients, one fabric can be made absolutely waterproof, another can be made resilient and crease-resistant, and another can be made coloured right through (as in dope-dyed rayon).

You will I am sure, forgive me if I do not stress the shortcomings of man-made fibres because of the laws of libel! But a few generalities are:

Firstly, most of them have very particular and narrow limits of use.

Secondly, few of them have what is sometimes called "Nature," meaning a kindly feel, etc.

Thirdly, this problem of other commodities catching the public's fancy. All these "toys" are a great distraction when Mr. and Mrs. Smith go shopping.

This is not a talk on the economics of house-hold budgeting in the mid-twentieth century but let us face the facts for a moment:—

The average budget can be broken down into six broad brackets:—

1. Providing a home and maintaining the fabric of it.
2. Feeding and clothing the family.
3. Education.
4. Transport.
5. Recreation.
6. Purchase and replacement of furnishings.

Now, not only does the re-stocking of the linen cupboard come last in this list but it can have the over-riding influence in all five above it of "Keeping up with the Joneses" and this cursed aspect of life to-day shoves No. 6 a long way down the shopping list!

To pause and recapitulate very briefly, we have first of all, inside limitations such as shortage of skilled labour, not much money for buying new plant and machinery—even if there were a lot of new processes and machines to buy—and the general difficulty of making "silk purse" material marketable and attractive to purchasers in the "sow's ear" spending bracket.

Secondly, we have the three 'outside' factors just noted, of other countries making their own new man-made fabrics and "keeping up with the Joneses."

So far, I must have sounded like a dyed-in-the-wool reactionary, busy defending the traditional methods and approaches. I am sure that none of you good people came here to listen to that sort of defeatism.

It is, however, always well to take stock of a situation before dashing around prescribing cures.

Many a doctor can see easily and quickly enough that a patient is off-colour. It is a different matter to know just what to prescribe to make the patient better and even in these days of a National Health programme with so much "for free," the cost still is a factor. For example, National Health may pay for the drugs and the doctor's skill but it does little to build up the morale of the patient or pay for the cost of a fortnight on the French Riviera.

One often hears such expressions as: "There is nothing wrong with me that winning a football pool wouldn't cure" or "There is nothing wrong with my morale or complexion that a month in Madeira wouldn't improve."

Similarly, believe me my friends, there is nothing wrong with the linen trade that a few more orders from the public—and this includes the citizens of Belfast—and a slice more business from sunny lands like Madeira, Australia and South Africa—wouldn't cure!

But what—you may ask—has all this to do with design?

Well, my creed, in a nutshell, and based on my few short years' experience in the Linen Industry is that, if our products are not attractive enough to our customers it is usually because of one or other factor—and sometimes both—price and design.



Now, the stresses of competition (a) overseas, from cheap labour (Iron Curtain country linens are about half the price of Irish linens) and (b) at home—from other fabrics and other delights such as L.P. records, etc., drive me to the conclusion that the strongest and sharpest weapon at our disposal is Design. If we can make our products eye-catching, nicer and gayer than the other fellow's, then perhaps we will get our products into that enviable list popularly called "The Top Ten" in the desires and *onto* the shopping lists of the public.

Of course, we must also remember one of the oldest adages in our language: "One man's meat is another man's poison," and so the business of prescribing these cures must take account of the many different circumstances in which this complex little industry of ours operates.

Although Marie Antoinette may have got away with it when she said: "If they can't get bread let them eat cake"! Yet we, as an industry cannot expect to sell only cake. We must sell bread and butter too.

As far as design is concerned there is little one can do to a piece of white cloth, but there is a lot one can do in how one presents it. This, not just in the way in which it is wrapped up but also in the good design of the ticket, the presentation of samples—both to the trade and to the public—and all along the line in all the small details of designing good stationery, etc., etc., and then, when the manufacturer has done his part, along comes the Irish Linen Guild which has the great responsibility of helping to present the various linen products to a coy public.

For a number of years the Industry has been raising funds—with aid from the Northern Ireland Government—and spending these funds all over the world in a magnificent programme of promotion, publicity, education, and encouragement and there is little doubt that this programme is helping.

You may say "but we don't see a lot of this advertising"—well, when you consider that all the Budget for Irish Linen throughout the world is less than half what any one of four or five soap manufacturers spends in the home markets alone, you will get some idea of the smallness of our task force to fight the battle for survival and progress. All things considered, I think we get a lot for our money.

And so we come to design—now design is an omnibus word and covers a tremendous number of facets so perhaps it would be as well to try to define some of these facets of design. If Professor Joad taught us anything during his membership of the 'Brains' Trust it was the importance of defining "What we mean by the word . . ." Let us try to define the three words "Art," "Design" and "Pattern."

I think for the purpose of this talk we can start by saying that Art is used in the sense of being one of the half dozen basic components which make up Industry. We have buying of materials, planning and production, costing of production, selling, accountancy. These five together with "Art" make up the whole unit of manufacturing.

Now at this stage, we can skip over all the details of the industrial problems involved in production and confine our thoughts for a few minutes to the designing of the component. Before passing on I should like to say one word about costing as being very closely related to designing. Obviously when one designs a product one is wise to have some idea of the price bracket into which the item is to find its place before marketing; and before final details of design can be contemplated a clear idea should be formed as to the approximate price. If you accept "Design" as one of these six main components, then we can proceed to:

- (1) The design of the article itself, and
- (2) The ornamentation.

In most manufactured things the "Design" is three-dimensional but in textiles and in one or two other industries it is nearly always only two-dimensional. For example

taking our own big industries in Belfast: ships, tobacco tins, whiskey bottles, and so on, are three-dimensional whereas textiles such as table cloths, dinner mats and so on, are only two-dimensional.

Continuing the business of defining one stage further it can be seen that while design of an article really covers its functions most articles are usually the better for some form of decoration, that is, the pattern. Now the word 'design' is often used to denote the pattern or ornament and I will not labour the point, but it does help initially to get our minds clear on these definitions (I shall try to keep to these distinctions).

"Good Design" has been defined as "Fitness for Purpose" but I should like to go further and say that it should also be **honest**, in three ways—

(a) **Honesty in purpose.** For example take electric clocks; grandfather clocks were originally designed some 5 or 6 feet tall to allow the heavy weight of the driving mechanism to travel a reasonable distance. It is not therefore good design to produce a case for a modern electric clock, looking like a grandfather clock, but containing all equipment for mixing cocktails!

(b) **Honesty in construction:** Here an example would be stained laths nailed on to the front of a villa. This style of architecture popularly called "Stockbroker's Tudor" is of course a dishonest representation in a form of construction; the original Tudor house being made of a frame-work of stout English oak filled in with mud, clay or bricks—the materials available in those days; this form of construction is replaced to-day by steel frame modern buildings, filled with concrete or glass bricks.

(c) **Honesty in material:** Here an example of dishonesty would be white deal brush-grained to look like oak. This is obvious dishonesty in trying to get a high price, perhaps, for something that looks better, implying longer-wearing properties than it really has.

When one asks one's self "Is it good design?" provided the article satisfies these three additional criteria it can usually be said to be of reasonably good design.

However, even when these demands are satisfied there are still many minor (or perhaps not so minor, really) aspects that have to be carefully considered. Here we come back to 'fitness for purpose' which covers what one might call a multitude of sins and many ingredients—good and bad.

In 'Fitness for purpose' there are many small facets of which a few would be—"Does a cup keep the tea hot or does the tea cool too quickly because the cup is too shallow and too wide?" A coal box may look nice but can you get the coal out of it easily?" A pen may look very streamlined but is it comfortable to hold and not slip in the fingers?" "A knife, fork and spoon may be comfortable to hold but do they cut and lift satisfactorily?"

An aspect of design which constantly irritates me is "lack of comfort." I have in mind an electric coffee pot which we have at home and the inside curve of the handle has a sharp 'V' section; with a full load of coffee it can hurt the hand abominably. It **looks** streamlined but as a handle is a dead loss.

But many articles may conform to these three honesties and also be fit for purpose yet fall short of being good design; why? The answer is that on top of these four main factors there is the all important factor of taste and appeal. Now practically everyone conceives that they have the magic faculty of distinguishing good design from bad and that it is a God-given gift to himself or herself. At the risk of being shot at I should like to submit that judgment of design—like so many other things—requires training and practice. It is not enough for a Manager or Director to say "I don't like that." Likes and dislikes, at least in industry, must be justified with a reason or because of detailed knowledge (what child has not been infuriated by a parent, who, when asked "Why can't I do so and so" is answered with "It's wrong because I say so").



### THE SCOPE FOR IMAGINATIVE DESIGN

So much for definitions; let us probe a little and see what is the scope and range available for imaginative designing. Is a **new** design necessarily an improvement on its predecessor?

I have already defined that one of the main prerequisites in designing an article is its "Fitness for Purpose" but that rather pre-supposes that one really knows exactly what product is to be made, and design in this case is either a matter of improving on existing designs or merely making a change for the sake of change. It is very unfortunate, but in Commerce buyers must have offered to them continually changing designs and although theoretically a good design must last for ever yet I suppose we must admit that life would be very drab, if, year after year, the same old designs were dished up in the shops. Apart from anything else change in designs increases demand and there are still a lot of people in the world who will buy an article in a new design simply because it is new and not necessarily because it does the job any better (many teapots for example, handed down from two and three generations keep the tea as hot and pour it out as well as contemporary ones!)

### INVENTION OR VARIATIONS ON A THEME

Now on top of new design for the sake of being different there is the vastly more important matter of creating something entirely new. Unfortunately this is one of the most difficult things in the world. I think it was Mark Twain who once said "that there are only 13 original jokes and the rest are all made out of them." I think the same broad principle holds for design and it is extremely rarely that an entirely new design is evolved. To take our own linen business; some thousands of years ago somebody thought of making table cloths, or coverings, in Damascus and somebody else in Egypt used linen piece goods for clothing and presumably bed covers. Many hundreds of years probably followed before somebody "invented" a table napkin; probably hundreds of years later somebody invented a bag—which could be frequently washed—into which they could stuff feathers, down, or other padding which was called a pillow. Almost within living memory somebody first thought of making lunch mats which are to-day every-day articles of household use. From this you will see—and I have, of course, over-simplified the matter—that it is only once in a very long era that somebody bounces up with an entirely new article and anyone who can to-day invent an article, container, or machine in textiles which is something entirely new is of course on the threshold of making a fortune. In saying this it is understood of course that there have been "variations on a theme" and not only have the shapes of articles that require covering been altered but there have been changes in materials.

A new fabric such as nylon (or some of the other man-made fibres) is not new design except in its elemental form in that a new substance has been created by modern-day chemical wizardry. Even here it is only an intrinsic change in the substance—the method of weaving remains.

As we cannot always afford to wait eternally for the "brain wave of the century" most designing is largely confined to the ornamenting of every-day articles and this applies to all industries of a similar nature to our own linen trade.

### TRADITIONAL OR CONTEMPORARY

However, it is not my main object this evening to go into all the various theories, likes and dislikes about pattern and ornamentation, but perhaps I may be forgiven if I do touch briefly on the subject of the two principal groups of design or pattern, namely "Traditional" and "Contemporary."

"Traditional" may be defined as styles which originate in such well-known periods as Jacobean, Adam, Wedgwood and so on, whereas, "Contemporary" is to-day's trend for simpler motifs and striking colour combinations or indeed the use

of single colours. Now of all the misunderstood words in the English language, I sometimes think that this word "Contemporary" heads the list. There is a great tendency, particularly among the public to shy away from it and to dismiss it as "something long haired and not quite nice." Why this should be I don't know; if people would only take the trouble to think of the basic meaning of the word which although defined by the Concise Oxford dictionary as "belonging to the same time" yet is understood, at least in artistic matters, to mean "belonging to the **present** time." Here we get back to our elemental factors. For example, Jacobean furniture with its massive oak construction was contemporary in its day; first of all because there were no imported woods and oak was the natural material; secondly, the style and ornamentation suited the rather crude tools available and thirdly, those who could afford a table usually had ample room in big Baronial Halls and indeed a stout construction of the table was necessary to carry the groaning board which suited their vast appetites. On this formula Jacobean furniture is not contemporary to-day. First of all there are many cheaper and more easily worked woods readily available from foreign countries, secondly because accommodation is so much more cramped in the modern house, and, of course, our tables don't exactly "groan" under the load of such food and drink as we can afford. Take our textile industry; the demand for white damask table cloths has undoubtedly fallen off as far as private domestic use is concerned. In a word it is not 'contemporary' because the style and finish of the cloth requires skilful laundering and is not easily laundered in the home. Again it is generally felt that coloured cloths require rather less laundering and so we have the change in popular demand from white linen damask—which of course is still a very lovable table covering but not very practical—to small plain-woven highly-coloured cloths or for that matter even smaller place mats which can be easily run through a tub or home washing machine.

But these two examples are rather negative in their approach to these problems of contemporary design and unfortunately there is a tendency in some places to run ahead of the ball. There are people who think that a design must be a weird collection of squares and triangles, etc., in the cubist manner to qualify as a contemporary design. Enthusiastic as I am for contemporary styles I have no use whatsoever for things which are "modernistic" with the wrong motives.

Look at it this way—Uffa Fox, the yacht designer, has said that "the wind and sea demand lines as lovely and as proud as a princess, if the yacht is to sail well . . ."

Nothing in life—certainly not in yachts—ever was right if it looked ugly. And it is generally agreed that swift aircraft and racing yachts, and even Derby winners, are practically always good to look at!

If you agree with Uffa Fox then obviously some of the fancy ornamenting that we find on every-day articles is quite unnecessary; who would dream of designing a yacht and then adding dummy cannon ports and a high poop to make it look as if it was related to something from hundreds of years ago? One sees a tremendous lot of things like lamp brackets, radio and T.V. cabinets and so on where the designer has imagined that merely by adding graduated tiers of blocks of wood (or other clutter) that he has achieved a modernistic look.

Carving was perhaps a very useful ornamentation in Jacobean days when, apart from its ornamental value, it helped to cover up flaws in the timber. In those days there were no precision lathes for turning out such things as wooden legs whereas to-day the symmetry and line of a turned leg replaces to a certain extent the carved ornamentation (in this context nothing can be worse than the very cheap stamped out carving that one sees so liberally glued on the surface of what is called contemporary furniture). The 'Swedish Modern' furniture designers rely entirely on pure shape and form and to a lesser extent on the colour and texture of the material. They don't try to paint a lily.



### ART IN INDUSTRY

Having dealt, perhaps at too great length, with design and pattern may I turn your attention for a few minutes to "art"? Now when it comes to art in industry it is very difficult to be dogmatic in any way because to my mind art really implies individual creative work rather than mass production. In other words, "art in industry" is really a contradiction in terms. Ruskin said "Manufacture is the work of hands only; art is the work of the whole spirit of man . . ." However, that is being a purist and I should like to deal for a few minutes with what you might call the artistic side of designing as opposed to designing a particular article for a particular purpose. This art angle can be confined almost 100 per cent. to the ornamentation and there are several schools of thought about the rights and wrongs of trends.

Josiah Wedgwood created a style in china which bears his name to-day and yet it was really a copy of a Greek style of vase-making as exemplified in the famous Portland vase. There is no doubt that Wedgwood products are original in their way and yet it is one more example of 'back to Mark Twain' and his 13 original jokes. I think it can be accepted, and, if I may say so, excused in that it was contemporary in its time because the materials, treatment and appearance were in keeping with the times. Adam, Chippendale, and all their contemporaries borrowed very freely from classical art in the motifs that they used such as urns, laurel leaves and so on. And so we come to to-day where ornamentation is a sort of football between the experts. Some people say that if a design, or an integral part of a design such as a motif, is good and pleasant it will always be good and pleasant regardless of the day and age, while those in the opposite camp shun plagiarism and maintain that contemporary art should be entirely new form and colour. Personally I like to see entirely new form and colour if there is such a thing. I know it is a case of over-simplification to say that there are only so many basic shapes and a limited number of colours in the rainbow and it may be possible to produce new ornamentation without borrowing from the past, but I'm afraid this seldom happens!

### SUMMARY—SIX RULES TO IMPROVE DESIGN STANDARD

Before showing you a few slides illustrating good and bad design in Textiles, may I just briefly summarise all these various and, perhaps, loosely connected thoughts:

1. Management and workers in factory and warehouse should be given every encouragement to think out and develop new ways of producing fabrics and improving their machinery.
2. Every effort should be made to encourage and develop our own native born designers and inventors; and in this context I should like to make a plea for closer co-operation with our excellent College of Technology and College of Art.
3. Salesmen must bear their share of the responsibility for a programme of new designs. They are nearest to the firing line (and indeed in it!) and their reports to headquarters can give early warnings of changes in demand and fashion.
4. The closest liaison should be built up and maintained between designing and selling. This is perhaps the weakest point at present in the Linen Trade's efforts.
5. Designers old and young, must be given more opportunity to get around and gain stimulus from fresh surroundings.
6. Each company should formulate a clear policy and fit it to their capabilities and potential markets. A large factory with perhaps 1,000 looms should concentrate on a range of designs that will sell a large output of cloth whereas a small factory or even a warehouse converter with no looms to worry about should strive to make a reputation for himself of a high standard of designs and excellent service to his customers. Unfortunately, the great majority of people still have conservative tastes and you cannot necessarily sell large quantities of the more extreme types of contemporary design.

12th February, 1963.

**THE RISE AND DECLINE OF THE IRON ORE AND BAUXITE INDUSTRY  
OF CO. ANTRIM**

H. E. WILSON, M.Sc.

In November, 1875, Dr. John F. Hodges, sometime President of the Belfast Natural History and Philosophical Society, Honorary Chemist to the Chemico-Agricultural Society of Ulster and Professor of Chemistry at Queen's College, addressed this Society on the origin and progress of the Iron Ore Industry in Co. Antrim. After a review of the history of iron mining and manufacture in Ireland he described his part in the founding of the Antrim industry and prophesied that the North of Ireland was about to become a great mining district and possibly the centre of an iron smelting industry.

As the mining of the ores of Antrim has long since ceased and the last of the railways built to transport them has disappeared, this paper might be regarded as a sequel to Hodge's address and as a chronicle of the rise and decline of the industry and of some of the social changes which it introduced.

The manufacture of iron in Ireland dates back to pre-historic times but was extensive in Ulster in the sixteenth century, when ore imported from Lancashire was smelted with charcoal from the wide forests of the Lagan Valley and Lough Neagh Basin. By 1700 most of the forests had been burned and for a century and a half iron working in Ireland was confined to the treatment of imported pig iron. In the mid-nineteenth century development of native iron ores started almost simultaneously in two areas of Co. Antrim, Ballycastle and Glenravel, with material of widely differing geological origin.

By 1850 the Ballycastle Coalfield had been worked for over 200 years for its easily mined coals. Interbedded with the coal seams, sandstones and shales of Carboniferous age, there are several thin and generally impersistent beds of clay-ironstone—a mixture of mud and chemically precipitated iron carbonate which is sometimes so mixed with carbonaceous material as to be dark in colour, when it is known as blackband ironstone. The best and thickest of these ironstones outcrops on the cliffs at Carrickmore, about three miles east of Ballycastle, and in the early 1850's was recognized as valuable.

According to a letter in the possession of the Antrim Estates office in Glenarm the Carrickmore ironstone was first worked by Robert Latta who, in 1854, as an agent for Messrs. Backhouse and Company, Bankers of Darlington, leased the field, erected a jetty at Carrickmore, and shipped calcined ironstone to Glasgow. In 1856 Latta was bankrupted by the loss of his schooner and the default of the insurers and as he puts it in the rather heart-breaking chronicle ". . . I had to let all go into my lessor's hands which excited an unfriendliness between us." The lessor was apparently the Antrim Estate and it appears that Messrs. Backhouse made some further arrangements with it because David Landell, a Mining Engineer, reporting in 1858 for the Boyd Estate, Ballycastle, stated that Messrs. Backhouse were working the ironstone then and indicated that they were trespassing into the Ballycastle Estate. After a legal injunction, production almost ceased in 1860-61.

In 1865 a Scottish firm of ironmasters, Merry and Cunningham, leased the ironstone from the Boyd Estate and worked it intensively till 1871 when they gave up their lease, allegedly because of a rise in rent and the hostility of the local labour—"one night the miners cut the hemp winding ropes and sent the cages to the bottom of the shaft"—but probably because the division of mining rights between the two



disputing estates made working uneconomic. Geddis (1871) quotes Cunningham as saying that they lost considerably by the lease. During their tenure, Merry and Cunningham worked some coal in the area and also worked a clayband ironstone higher in the succession which they mixed with the blackband.

In 1871 John Geddis in a report for the Ballycastle Estate said that the mines were abandoned and all plant removed by July of that year, but the Mineral Statistics of the Board of Trade show substantial production for 1872-3 and there was apparently a further lessee for this period. Production of 30,000 tons in 1872 was the highest recorded in any one year from this area. Mineral Statistics also show a small production for the years 1875-6, an output of 4,375 tons in 1879 and 1,057 tons in 1880. It is not known who worked the mines at this period but there is no record of any production after 1880 except for 625 tons in 1891.

The Ballycastle ore was all calcined—that is, the coaly material in the seam was burnt out and the iron carbonate converted to iron oxide—on “hearth” on the coast near Carrickmore and the flat terraces formed of the waste from this process are still a conspicuous feature on the shore there. The calcined ore was all shipped away by sea and transport was no difficulty—except for the problem of getting ships berthed on the exposed coast.

Even before Latta started to work the Ballycastle ironstone, investigations into the other source of iron ore in the County had started. Much of Antrim is underlain by basalt lava flows often separated by thin red laterite beds, the result of sub-aerial weathering of the lavas. At two periods during the volcanic epoch there were prolonged lulls in the extrusion of the lavas and the uppermost flows were weathered to a depth of over fifty feet in places. The weathering processes may be summarized as kaolinization of the minerals of the basalt, followed by lateritization of the lithomarge so formed. The complex silicate minerals of the basalt—olivine, augite, and feldspar—first break down into their constituent oxides some of which, notably magnesia, lime and the alkalis, are more or less completely eliminated in solution. The silica and alumina released combine with water to form kaolinite or halloysite, and the oxides of iron and titanium remain. The lithomarge so formed is a characteristic purplish mottled material. The decomposition of the kaolinite/halloysite in the lithomarge, with the elimination by leaching of the silica, leaves hydrated alumina (gibbsite), and simultaneous upward segregation of the iron and titanium oxides tends to give a layered separation of iron-rich and alumina-rich beds. The conditions under which this took place were probably moist tropical or sub-tropical, with abundant decomposing vegetation to give a slightly acid ground-water. If the processes are allowed to continue for long enough the iron oxides tend to be concentrated into a thin bed at the top, often in the form of small “pisolites” or pellets of pure iron oxide passing down into more or less ferruginous alumina (bauxite) and this in turn into purplish lithomarge. In places the remains of vegetation, in the form of lignite or brown coal, are preserved at the top of the laterite bed.

The process was a very slow one and appears to have been rarely completed in Antrim before the weathering was stopped by the outpouring of fresh lava flows. Post-volcanic denudation of the lava pile has removed the upper lava series and the “Interbasaltic” laterite beds over much of the county and now they occur in a number of isolated outliers, generally on the high ground of the Antrim hills. In a few of these the iron and bauxite segregations are sufficiently rich to be of economic value.

In 1843 Louis Crommelin, who had been endeavouring to improve the conditions of the inhabitants of the district round the village of Newtown Crommelin, asked Professor Hodges to examine some red rock found in the area. Hodges found it to contain 18.25 per cent. iron and Crommelin built a small furnace, which still stands on the banks of the Skerry Water near the village, and conducted prolonged experi-

ments in smelting this poor ore with peat and peat-charcoal. Though some slaggy metal was produced it proved impossible to make usable iron and Crommelin finally abandoned his experiments.

In 1848 the Belfast-Ballymena railway was built and in a cutting at Ballypalliday near Templepatrick it passed through the bright red laterite of the Interbasaltic Bed. This came to the notice of Dr. Ritchie, a Belfast iron-founder, and apparently he interested the iron-masters of Lancashire in this "ore," which was a ferruginous bauxite of the type tried by Crommelin. This "aluminous ore," though useless as a primary source of iron, proved to be of value as a flux in smelting the Furness haematites and Ritchie worked the ore at Ballypalliday and later at Ballylumford, Islandmagee, for many years from 1861. Unfortunately, this operation is completely undocumented and we know little of its history.

From an account given by Hodges's son in the *Journal of the Chemico-Agricultural Society of Ulster* (1882) and letters written in 1909 by J. F. Hodges, Junior, and by James Fisher, Junior, to J. R. Kilroe of the Geological Survey of Ireland, it is possible to give a more complete account of the main development of the iron-mining industry than that given by Professor Hodges to the Society in 1875.

Some time after the failure of Crommelin's experiments Mr. Edward Benn, landowner of the Glenravel area, showed some of the ore from his estate to a Dr. Buchanan of Scotland, and Mr. Rowan, a Belfast iron founder and manufacturer of what was possibly Ireland's first steam road vehicle. With their encouragement Benn got a tenant, John McAlister, a smith of Legagrane, to smelt some in his forge and produce a small sample of iron. This was taken by Mr. Rowan to his foundry where a nail-smith pronounced it "as good a sample of Swedish iron as he had ever worked." Benn then employed Pat Doran, an itinerant mineral collector, to obtain a sample of the best material which was analysed by Professor Hodges. According to Hodges, Junior, this analysis was made in 1867.

In November, 1866, however, another figure appeared on the scene. This was James Fisher, a Barrow-in-Furness shipowner whose name is preserved in that part of the village of Cargan, including the post office, still known as Fisherstown. The story of his activities is best left to his son, in the words of his letter to Kilroe: "... let me first explain that it was my father who first perceived the value of the ore found in Glenravel, and it arose in this way. About the year 1864 he became the owner of an Estate in The Braid, situated about eight miles from Ballymena and known as Cleggan, and soon after made it his principal residence, removing to it with his family about 1866. The nearest neighbour was the Rev. Father William John Macauley, Parish Priest of the Braid and Glenravel, a man of unusual disposition for a position of that sort. He was personally well known to me from the outset and it was at the earliest stage of my father's residence in Ireland that the question of minerals was broached. Previous to that my father had been closely identified with projects for the discovery of Iron Ore in Lancashire and Cumberland and as a shipowner for its transport from this place (i.e., Barrow), at a time when there were no docks here. As a result of the conversations between him and the priest the latter, on returning from Glenravel after performing his duties on a Sunday, brought with him the first piece of Glenravel ore that I ever saw, and subsequently I, then aged about 14 years, drove the two gentlemen on an outside car from Cleggan to Cargan, on an exploring expedition. It was an exceedingly hot day and the priest was not much interested in the exploration, being more inclined to enjoy the comfort of a suitable resting place and a pipe, interspersed with an occasional 'Sprint' in opposition to myself who, needless to say, seeing that he was a man of anywhere between 16 and 20 stones, and I a stripling, with no weaknesses, invariably resulted in his discomfiture. Neither of us therefore had anything to do with the actual discovery of the ore, which was made by my father, who was at the time about 40 years of age and this was how it was done. The man who



had brought the sample to the priest was literally unearthed (i.e.) he was found in a wretched cabin little better than earth hole. He appeared to me a very ancient Briton, although I have since learnt that he was only about 70 and I know he lived for well nigh 30 years after my first acquaintance with him. Another man was also discovered and the three proceeded to the brook which flows past the foot of Balnahalva Brae and preceded by my father, they ascended it until all traces of the red mineral were lost. Returning by the same route, they again 'struck' the trail, and here a close scrutiny followed with the result that above their level, the bed of ore was found under the overhanging peat and coarse heather. It was an easy matter to cut off this overhanging flange, and drop it into the stream. When that had been done the ore to the depth of about two feet was exposed to the rays of the sun, having slept for ages within a stone throw of the public highways. We left the scene of this discovery about four o'clock in the evening and proceeded to Glenravel House where we met the late Mr. Edward Benn who was very pleased to think that it might be possible to find work in the district for the poor creatures who lived in it, and before we left he granted to my father permission to dig and develop in any way he could, for a year, in order to demonstrate whether or not the project was worth following up. The price to be paid for this concession was £10 and the agreement, in the absence of note or any other kind of suitable paper was written on the inside of a used envelope, now framed and in the possession of Mr. J. F. W. Hodges, J.P."

The letter goes on to emphasise that at first only the top-grade pisolitic ore was worked for its value as an iron ore, but later the aluminous or second-grade ore was also mined in Glenravel and sold as a flux, as was Ritchie's ore from Ballypalliday. Fisher also makes the point that even the best of the Antrim ore was not used by itself in the furnaces but was mixed with other ores. Smelted alone "some of the pellets which had passed through the furnace ran out into the pig-bed intact, the iron when broken resembling what sailors call 'Speckled Dick' viz. a pudding with raisins in it."

Fisher commenced to work his concession with energy, starting with outcrop mining along the hillside but soon driving adits and working the ore bed underground. His success was quickly noted and soon the Antrim Mining Company at Cargan, the Parkmore Iron Ore Company, the Evishacrow Iron Ore Company and others were in the field.

The most dramatic local effect of this activity was on the availability of labour, not only for the mines but for cartage of the ore to the railway at Ballymena or to the sea at Red Bay. The ordinary agricultural labourer, we are told, soon acquired the skills of mining and from 7s. a week in 1867 wages rose to 15s. to 20s. per week underground and 13s. to 14s. on the surface by 1875. Seven hundred men were directly employed at the mines with consequent labour shortage on the surrounding farms.

With annual production soaring from 33,000 tons in 1870 to 133,000 tons in 1871 the problem of transport soon became acute. Cartage to Ballymena or Red Bay was 1s. 9d. to 2s. per ton at first and soon started to rise. The first attempt to mechanise this transportation was the construction by the Antrim Wire Tramway Company, subsidiary of the Wire Tramway Company of London, of an aerial ropeway from Red Bay Pier towards the Glenravel Mines. This was opened in 1872 and in July, 1873 was sabotaged, presumably by the carters who were being displaced by its operation. The Belfast Newsletter of 26th July, 1873 carried an account of this under the heading "Diabolical Outrage"—

"A most disgraceful outrage was wantonly perpetrated at Parkmore, near Red Bay, on the night of Sunday 13th (July). On that night it appears that the massive wire rope of the wire tramway, constructed for the conveyance of ore from the iron

mines at Cargan to Red Bay Pier, was maliciously cut asunder by some person or persons unknown, whereby the traffic along the entire line, extending over a distance of about a dozen miles, was necessarily suspended. The tramway . . . has been in operation for months past . . .”

The only known plan showing the route of this ropeway is the Geological Survey field map of the area west of Red Bay, on which the geologist, W. A. Traill, has marked the line of the disused Wire Tramway at the time of his survey in 1880. (Fig. 1). It seems clear that the ropeway extended to the Cargan district and that it was used for some time. In 1875, however, the concern was sold in bankruptcy and bought by the Ballymena-Cushendall and Red Bay Railway who kept the section from Retreat to Red Bay in position until 1881.

In 1873 the Glenariff Iron Ore Company was incorporated to mine iron ore at the west end of the Glen, some 700 feet above sea level. The Company constructed the first 3-feet gauge railway in Ireland which, from a jetty at the east end of Red Bay, crossed the road at the White Arch, where the buttresses still stand, and climbed steadily up the south side of Glenariff. The line of the track and the viaduct at Greenaghan can still be clearly seen from the north side of the glen. The Company soon became insolvent and the line and rolling stock were sold in March, 1885. The track hopefully left in position by the Earl of Antrim in the expectation of future mining, was partly stolen in 1890, following the earlier example of the Parsonstown and Portumna Bridge Railway which “vanished” in 1883. The engine shed, near the White Arch, is today used as a Parish Hall, and the houses built there for the miners and railwaymen are still occupied.

In 1872 Parliament sanctioned the building of a railway from Ballymena to tap the iron-mining areas and this, the first Irish public narrow gauge railway, was opened to Cargan in 1875 and to Retreat in 1876. Though called the Ballymena-Cushendall and Red Bay Railway it never reached the sea and it is probable that, with the purchase of the wire tramway in 1875 its route was altered to link up with that system at Retreat. There is no record, however, of ore ever being moved by rail via Retreat. There were at least six sidings to the mines, the longest being that which ran to Salmon’s Drift, about three miles from the main line. On that at Cargan the wagons were hauled by winch up a steep incline to a higher level, and the massive walls of the winch house still stand on a hill to the north of the village. Some of these sidings may have been tramways of narrower gauge

With the opening of this line the output of ore rose rapidly and in 1880 reached its maximum of 230,000 tons. At this period optimism was widespread. In 1878 the Ballymena and Larne railway was completed and in 1880 linked with the Cushendall line to allow direct transportation to the quay without break of gauge at Ballymena. Parliamentary approval was obtained for extensions to the Braid valley to serve the mines at Clonetrace and to the Bann at Portglenone and schemes were proposed to link this network with the Ballycastle Railway by way of Clogh and Dervock and thence to the “Giant’s Causeway, Portrush and Bush Valley Railway and Tramway” at Bushmills, while the Portglenone line was to be thrust across the Bann towards Limavady and Londonderry. Behind these imaginative proposals can be seen the hands of two enthusiastic men—W. A. Traill, who had left the Geological Survey to build the Portrush-Giant’s Causeway tramway in his beloved North Antrim, and J. Chaine, creator of Larne Harbour and the Larne-Ballymena railway.

None of these schemes came to fruition, probably because in 1881 the output of the iron ore mines started to fall, and by 1884 was down to about 100,000 tons per annum. This was undoubtedly due to the working out of the easily won material near



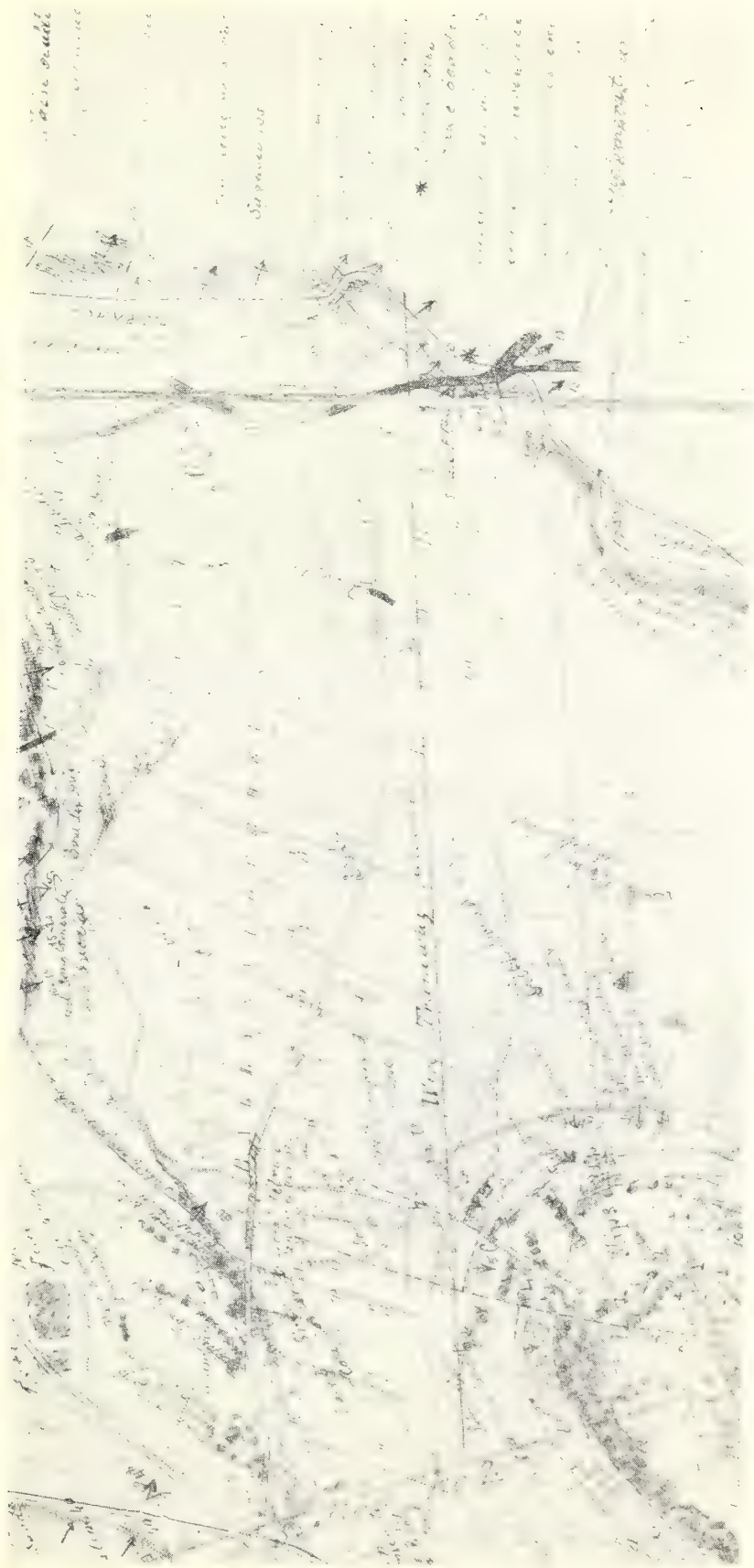


FIG. 1—Portion of W. A. Traill's geological field map showing the line of the Wire Tramway west of Red Bay Pier.





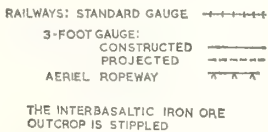


FIG. 2—Map of the Interbasaltic Iron Ore district of central Co. Antrim, showing the transport system, developed and projected.

outcrop, and though there was an improvement to a figure of over 160,000 tons in 1889, the fall was again resumed in 1891. The increasing difficulties in the Glenravel district encouraged exploration in all the other areas where the ore beds were known to occur and from the late 1880's the names of mines in the Portrush-Dunluce area and on outliers like Lyles Hill appear in the returns.

With the writing on the wall the owners of the Cushendall and Red Bay Railway were glad to sell out to the broad-gauge Company, the Belfast and Northern Counties Railway, in 1884 and by 1886 the directors of the latter took steps to make their new toy profitable by opening the line to passenger traffic as far as Knockanally. In 1888 passenger traffic was extended to Parkmore and in 1889 the B.N.C.R. proudly announced the opening of the "Vale of Glenariff" and excursions were run from Belfast and elsewhere, the visitors being carried down to the "Vale" by jaunting car from Parkmore. The wide park for the cars can still be seen outside the derelict station and the path down the hanging valley is still maintained by the Ulster Transport Authority.

The ore from Lyles Hill and the mines above Glenarm was probably carried to rail head or port by cart. From the Dunluce mines it may well have been carried to Portrush harbour by the Portrush and Giant's Causeway tramway which ran close to the mines. The ore from Clonetrace was hauled to rail head at Ballymena in wagons drawn by a steam traction engine preceded by a man with a red flag. The damage caused to the roads by this conveyance was for many years a source of local contention.

Simultaneously with the mining of iron ore the value of the bauxite, the other useful component of the laterite beds, became apparent. The low grade ferruginous bauxite which everywhere underlies the iron ore is generally of little value as a source of alumina, but it is a curious fact that where the laterite is overlain by lignite the iron-rich band is generally absent and the underlying bauxite is of better grade. It is not clear who first realised that this "aluminous ore" was worth working but Alex Sutherland certainly recognised it at Irish Hill, near Straid, in 1870 and by 1871 he and Blackwell were working it at this place. Subsequently it was worked at Portrush and Ballintoy by the Eglinton Chemical Company of Glasgow, at Libbert near Glenarm, at Agnew's Hill, at Cargan and at Skerry East near Newtown Crommelin, but never on the scale of the iron ore. Production is first recorded in 1881 and ranged from 4000 to 1300 tons per annum until 1920. Most, if not all, of the Antrim bauxite was exported to be used as "Alum Clay" for the manufacture of aluminium sulphate. Though the British Aluminium Company opened a works at Larne about 1900 it does not seem that they ever used much Antrim ore but treated imported ore here before sending it on to their smelters at Kinlochleven and Lochaber.

After 1891 production of iron ore fluctuated at between 70,000 and 120,000 tons per annum until 1907. Thereafter the fall was swift and in spite of a slight revival in 1919 the output of iron ceased in 1925. The last companies working it were the Antrim Iron Ore Company which ceased production in 1924 (but still exists as a coal importer) and the Crommelin Mining Company which ceased iron production in 1925 but continued to produce some bauxite up to 1934. In latter days the bauxite was transhipped to broad gauge wagons at Ballymena and exported by way of Belfast.

The closure of mines in the years after 1907 soon reversed the labour conditions prevailing in the 1870's. Many miners reverted to casual labour at lower rates of pay but many emigrated to mining jobs in Great Britain, particularly to the coal mines of western Scotland. Only in a few places had miners' houses been specially built and most of these have remained occupied, as at Waterfoot. The gaunt row



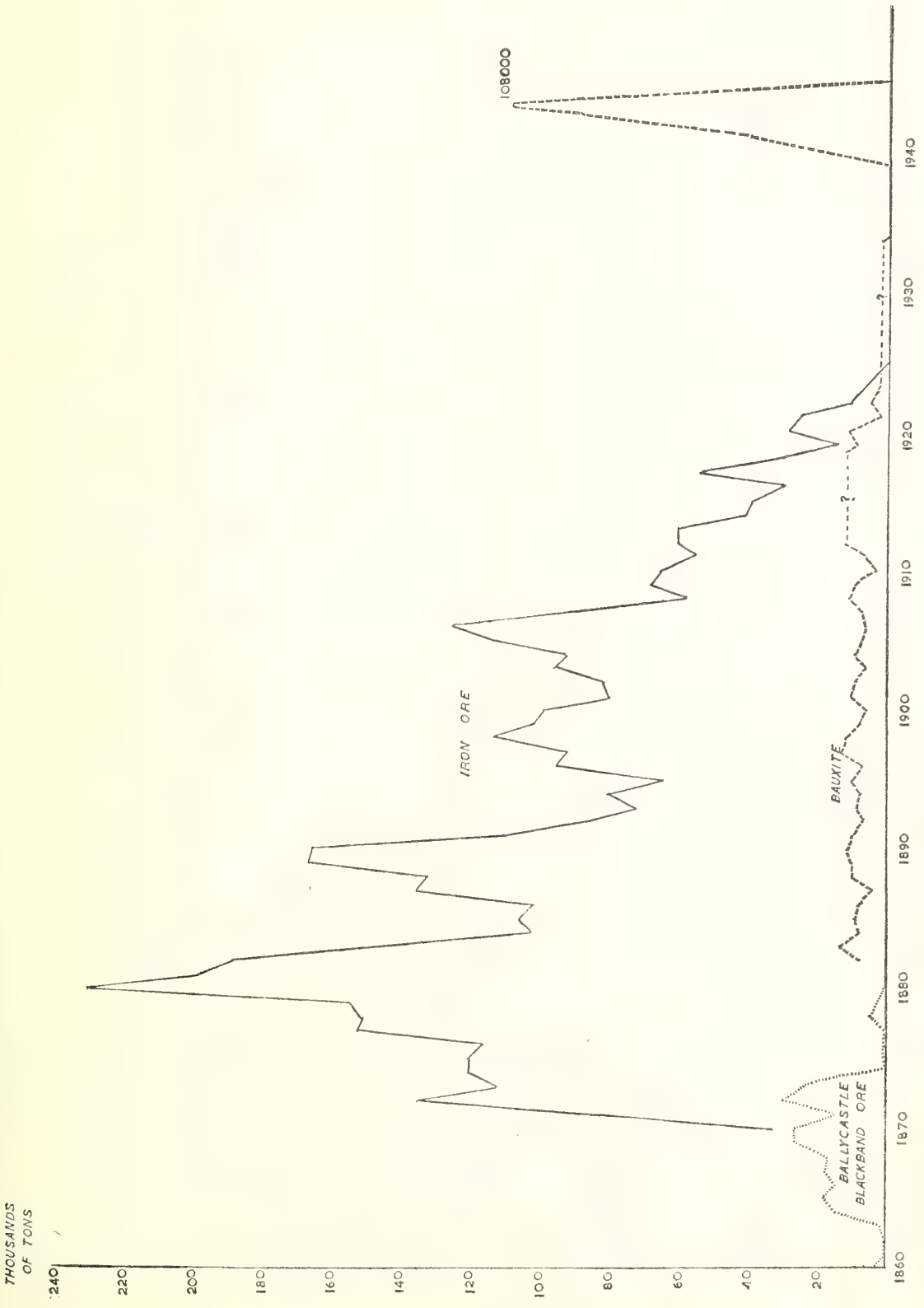


FIG. 3—Graph showing the production of Iron Ore and Bauxite in Co. Antrim, 1860-1945.

built just beyond Parkmore station has gradually fallen into decay and recently all but one of the houses have been demolished.

The decline of the mineral traffic and competition from road services soon caused the retrenchment of the railways. Passenger services on the Parkmore line ceased in 1930 and in spite of new coaches and refurbished services the Ballymena-Larne line followed suit in 1933. Goods services continued until 1940, though after 1937 the line was closed between Rathkenny and Retreat, only the creamery at Rathkenny justifying its retention to that terminus. In 1940 all the lines were lifted except the Larne-Ballyclare branch which lingered for a further decade. At this time the mining industry in Antrim seemed to be dead, but its finest hour was yet to come.

The war-time demand for aluminium for aircraft manufacture, and the difficulty of importing foreign bauxite because of the submarine menace, caused the Ministry of Aircraft Production to start investigation of the possibility of large-scale bauxite mining in Antrim. Mr. V. A. Eyles of the Geological Survey of Great Britain was sent to Northern Ireland in 1940 to investigate the reserves, and by 1941 work had started at Elginny near Broughshane, Skerry West near Newtown Crommelin and Lyles Hill. Elginny and Skerry West were small producers but the Ballynabarnish area, just north of Lyles Hill and part of the same outlier, came into production in 1943. The major part of the total produced came from these latter areas. Output increased from about 1,300 tons in 1941 to 108,000 in 1943 and then fell off to 36,000 in 1945, the last year of production. In all, 296,000 tons were produced with an average of over 40 per cent. of  $\text{Al}_2\text{O}_3$ . The ultimate yield of some 60,000 tons of aluminium was of obvious importance to the war effort of the United Kingdom.

Some iron ore was also produced during this period from the bauxite mines as a by-product and was used in Scotland and Northern England but the quantity was small.

Bauxite was also produced in small quantities in 1945 "near Carnlough," probably from the Cullinane area, but it is not clear what it was used for. It may have been exported as "Alum Clay."

Since 1945 there has been no further working of the Antrim interbasaltic ores and all that remains of this once flourishing industry are the tracks of the little railways built to serve it and the mine dumps, now becoming grassed over and inconspicuous. It seems improbable that the iron ore will ever be worked again as it is too difficult to mine and of too low a grade to compete with foreign ores. There are still large reserves of rather low-grade bauxite which may some day be of use, though here again mined ore cannot compete with opencast production overseas. It seems likely that in the last lorry-load from Lyles Hill in 1945 the Antrim mining industry ended.

The correspondence referred to between J. R. Kilroe and Messrs. Fisher and Hodges is in the files of the Geological Survey of Ireland now held by the Geological Survey of Northern Ireland. I am indebted to Mr. J. H. Smith for information about Mr. Rowan, the Belfast Ironfounder, and for the newspaper reference to the sabotage of the Aerial Ropeway, and to Mr. Clark, Agent of the Antrim Estate and Mr. Gault, Agent for the Ballycastle Estate for access to correspondence and mining reports. Information from the latter sources was obtained in the course of my duties with the Geological Survey. The portion of the geological field map of Red Bay is reproduced by permission of the Director of Geological Survey in Northern Ireland.



REFERENCES

- BLACKWELL, G. G., 1895. Notes on Bauxite of Co. Antrim and its Uses in the Manufacture. *Trans. Manch. Geol. Soc.*, 22, pp. 525-7.
- COLE and OTHERS, 1912. The Interbasaltic Rocks (Iron Ores and Bauxite) of North-East Ireland. *Mem. Geol. Surv. Ireland*.
- EYLES, V. A., 1952. The Composition and Origin of the Antrim Laterites and Bauxites. *Mem. Geol. Surv. Northern Ireland*.
- HODGES, J. F., 1876. *Proc. Belfast Nat. Hist. and Phil. Soc.*, pp. 1-8.
- HODGES, Jr., J. F., 1882. The Ulster Iron Mines. *J. Chemico-Agricultural Soc. of Ulster XVI.*, pp. 51-54, 61-63.
- KINAHAN, G. H., 1895. On the Iron Ore Measures of Co. Antrim. *Trans. Manch. Geol. Soc.*, 22, pp. 458-66.  
— 1895. Antrim Alumyte. *Trans. Manch. Geol. Soc.*, 23, pp. 165-74.
- PEITE, W., 1895. Notes and Analyses of Iron Ores and Bauxite, from the Crommelin Mines, Co. Antrim. *Trans. Manch. Geol. Soc.*, 22, pp. 522-25.
- TATE, R. and J. S. HOLDEN, 1870. On the Iron Ores associated with the Basalts of the North-east of Ireland. *Q. Jour. Geol. Soc.*, 26, pp. 151.
- WILLIAMS, C. H., 1895. Practical Notes on the Mining of Iron Ores, Bauxites, etc. of Co. Antrim. *Trans. Manch. Geol. Soc.*, 22, pp. 518-21.

2nd April, 1963.

**THOMAS LEDLIE BIRCH, UNITED IRISHMAN**  
**AIKEN McCLELLAND**

One of the most interesting periods in Ulster history is the story of the rise of the United Irishmen and the subsequent rebellion of 1798. The tragic fate of the Rev. James Porter, of Greyabbey, who was hanged within sight of his church, is known to everyone interested in the subject, but paradoxically Porter's fate has tended to obscure the fact that roughly thirty ministers of the Synod of Ulster were implicated, to a greater or less degree, with the United Irishmen, and that eight were compelled to leave their native shores.

In 1797 the Rev. Arthur McMahon of Holywood fled to France and the Rev. John Arnold of Ballybay escaped to America to avoid arrest, and after the failure of the insurrection six Presbyterian ministers were compelled to emigrate to the U.S.A. These exiles were John McNish of Clough, Co. Antrim, James Simpson of 1st Newtownards, James Sinclair of the Newtownards Old Congregation, Thomas Ledlie Birch of Saintfield, Robert Steele of Scrigan, a now extinct congregation near Dungiven, and John Glendy of Maghera.

Glendy, who was chosen as Chaplain to the House of Representatives in 1806, and Chaplain to the Senate in 1815, and who counted Presidents Jefferson, Madison, Monroe and Adams among his intimate friends, is the only one of the seven American exiles about whom much has been written, and indeed it would be impossible to write a full-scale biography of Thomas Ledlie Birch—the materials do not exist, and this paper is the first detailed account of his career.

On 13th April, 1692, John Birch received from Sir John Magill a grant of one hundred and seventy six acres of land now known as Birchgrove, near Gilford, Co. Down. Birch, who was described as Sir John's agent and manager, sold the property in 1725 to James Birch, presumably a relative. James married Mary Jackson and died in 1727, and the lands passed to his elder son, John.<sup>(1)</sup>

John Birch, 'a zealous dissenter' and an officer in the Down Militia, married Jane, daughter of John Ledlie of Carnan, parish of Arboe, Co. Tyrone, a prosperous

---

<sup>(1)</sup> John Birch died July 31, 1773, aged 62, and the property passed to his eldest son, John, who married, February 12, 1770, Jane, daughter of George Watson of Craigduff. Her sister, Elizabeth, married William Crozier, a cousin of John Birch. George Watson was first cousin of Commodore Watson, whose son, James Watson of Brookhill, was a famous Orange hero.

John Birch died November 7, 1786, aged 49, and the property then passed to his elder son, George, who was perpetual curate of Comber. The Rev. George Birch, who married in 1790, Anne, daughter of Adam Blair Johnston of Glynn, died October 28, 1827. He was succeeded in the property by his eldest son, John. John married, March 5, 1845, his cousin, Mary Jane McConnell, and died without legitimate issue, February 10, 1858, aged 55.

Birchgrove now passed into the possession of Hugh McConnell, brother-in-law and cousin of the previous owner. His mother, Anne, was the eldest sister of the Rev. George Birch. Hugh McConnell died April 24, 1898, and the last member of the family to own Birchgrove was his only son, George Birch McConnell, who died unmarried February 10, 1908, aged 46.

Birchgrove was divided several times, and from 1771 a branch of the family occupied a portion known as the Island Farm. The branch became extinct in the male line on the death of Thomas Birch, who died unmarried December 1, 1908, and the property was sold, thus ending the family's tenure of over 200 years.

Mary Jackson, the wife of James Birch, was a native of Tobermore, Co. Londonderry. She was a cousin of John Clarke of Maghera, ancestor of the families of Clark of Ampertain House and Chichester-Clark of Moyola Park and Largantogher.

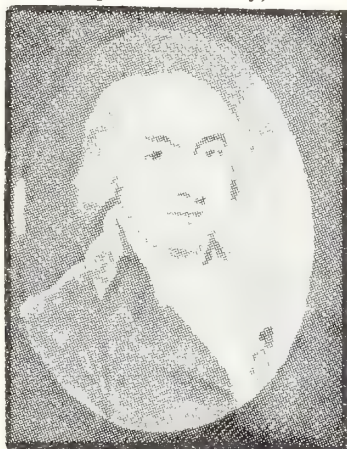
Clarke married Jane, daughter of John White of Antrim. Her sister, Elizabeth, married John Ledlie of Carnan, and was the grandmother of Thomas Ledlie Birch.



linen merchant and farmer.<sup>(2)</sup> They had nine children, the youngest of whom, Thomas Ledlie, was born in 1754.<sup>(3)</sup>

An elder brother had entered the ministry, and Birch decided to follow in his brother's footsteps<sup>(4)</sup>. In 1770 he became a student of Glasgow University, where he graduated two years later. The Rev. Andrew Craig, minister of the Lisburn congregation (1782-1833), and a contemporary of Birch at the university, tells us in his autobiography that Birch was one of a group of Irish students who started a weekly debating society at the university<sup>(5)</sup>. This society apparently flourished for several years, as Craig refers to meetings being held in Ireland in the summer of 1775.

Birch's name first appears in the minutes of the General Synod of Ulster in 1774, when it is recorded that the Saintfield congregation, vacant through the death of the Rev. Richard Walker, who died 26th January, 1774, had applied to the Presbytery of Dromore for 'a month's hearing of Mr. Birch.' The Presbytery referred the matter to the Synod, who decided that Birch should supply the congregation on the last two Sundays in July. They were probably influenced in their partial refusal by the fact that Birch was not yet a licentiate, as it is not until a meeting of the General Synod held in Antrim on 27th June, 1775, that the Presbytery of Dromore report his licensure.<sup>(6)</sup> A year later, 21st May, 1776, he was ordained in Saintfield by the Presbytery of Belfast.<sup>(7)</sup>



(2) Birch-Ledlie marriage settlement is dated December 28, 1732. Groves Transcripts: P.R.O., N.I.

Mrs. Birch died April 23, 1791, aged 75.

(3) C. J. Robb, in an article, *The Rebel Minister of Saintfield in The Leader*, February 10, 1945, quotes the following extract from a family bible—Thomas Ledlie, fourth child, was born betwt 3 and 4 of the clock in the morning, 8th February, 1745.' The same writer, in the *Sunday Press*, May 1, 1955, states that Birch was born April 24, 1755. In view of this discrepancy I have taken the date of birth from the *Fasti of the Irish Presbyterian Church*.

*The Matriculation Album of Glasgow University* states that Birch was the sixth son.

(4) Rev. James Jackson Birch, second son of John Birch, was born in 1740. He graduated at Glasgow University in 1758, and was ordained in Dromara, his only charge, on August 12, 1764. He retired in 1816, and died October 10, 1820.

*A Short History of First Dromara* (1963) by the present writer contains pedigrees of his descendants, and also of his sister, Mary, who married a son of the Rev. John King of Dromara.

(5) *Ulster Journal of Archaeology*: Second Series, XIV, p. 51.

(6) Until 1840 licentiates were permitted to act as ruling elders, and Birch attended this meeting as the representative elder of the Dromara congregation.

(7) Records of the General Synod of Ulster: II pp. 563, 570 and 571.

It is interesting to note that both the Rev. James and the Rev. Thomas Birch were ordained in congregations in which their relatives were influential members. Their eldest sister, Elizabeth, was married to Alexander Gillmer of Dromara, and Jane Birch, their aunt, was married to Andrew Todd, one of the wealthiest members of the Saintfield congregation.

The Todd family of Carricknaveagh, which was known as Toddstown as early as 1625, were prominent United Irishmen. The names of Andrew Todd (Birch's cousin) and Andrew Todd, junior, appear in the 'Black Book of the North of Ireland,' a list of some 200 names of the leaders of the United Irishmen. When the rebellion broke out Andrew Todd, junior, joined the rebel ranks, and acted as Captain of the Town Guard when Ballynahinch was in insurgent hands. After the rebellion was crushed he was imprisoned for a short time in Lisburn. Todd later married a sister of Birch's successor, Rev. Henry Simpson (1799-1843), and his descendants still live in Carricknaveagh.

Although Birch is remembered to-day as a minor figure in the late eighteenth century political scene it should not be forgotten that he was an active minister in one of the largest Presbyterian congregations in Ireland. The present First Saintfield Presbyterian Church was built during his ministry, and a tablet in the vestibule bears the inscription: 'Consider that ye here Worship in the Presence of Him Who seeth your actions and will shortly be your judge. Built in the year 1777—Thomas L. Birch, A.M., Minister.'<sup>(8)</sup>

He was also a regular attender of the meetings of the General Synod of Ulster, and was six times unsuccessfully proposed as Moderator. His lack of success cannot be explained by his political views, as two of his successful opponents were the Rev. Samuel Barber of Rathfriland and the Rev. Dr. William Steele Dickson, of Portaferry, each of whom was to be implicated in the Rebellion of 1798. In 1793 he preached before the Synod, and his sermon, 'a commonplace address,' was published the next year.<sup>(9)</sup>

Birch's interest in the social problems of his day is shown in a letter written in 1785 to Sir John Foster, M.P., in which he deploras the hordes of strolling beggars which were harassing the community. He suggests to Foster that the matter be raised in parliament, and 'some law framed, obliging strolling beggars to keep within the bounds of their own parishes—where they are known, and inflicting a penalty upon such as harbour foreigners.'<sup>(10)</sup>

Little is known of Birch's private life. He married, in the autumn of 1783, Isabella Ledlie, his second cousin, and a daughter of John Ledlie of Arboe, Co. Tyrone.<sup>(11)</sup>

<sup>(8)</sup> The church was apparently in debt for some years as the *Belfast News-Letter*, January 7, 1783, records that the Earl of Moira subscribed ten guineas to the re-building fund.

The church clock was presented to the congregation by Dr. George Birch, an elder brother of the pastor. A former surgeon in the East India Company, he resided at Ballybeen House, Comber, and was the owner of considerable property in Co. Down.

Dr. Birch was a staunch Presbyterian, and a member of the Moneyrea congregation. At a special meeting of the General Synod of Ulster held in Lurgan in October, 1800, he was chosen to accompany the Moderator to interview Lord Castlereagh to press the Synod's claims for an increase to the Regium Donum and to urge the government to establish a fund to repair churches.

While in India he had married Catherine Charlotte Wilder, a young widow, one of whose daughters was later to marry Robert Rollo Reid of Ballygowan House, a noted United Irishman. Dr. Birch had three sons and three daughters, and after his death in 1814 his property passed to his youngest son, James. James joined the established church, and worshipped in Comber Parish Church, where his cousin, Rev. George Birch, was perpetual curate. His heir emigrated to New Zealand, where his descendants still live.

A daughter of Dr. Birch married Randal Johnston of Glynn, a brother of the wife of the Rev. George Birch.

<sup>(9)</sup> *The Obligation upon Christians and especially Ministers, to be exemplary in their lives; particularly at this important period, when the prophecies are seemingly about to be fulfilled in the fall of Antichrist as an introduction to the flowing in of Jew and Gentile into the Christian Church, Synodical Sermon on Matt. v. 16.* pp. 36, Belfast, 1794.

<sup>(10)</sup> Massereene Mss. P.R.O. (N.I.)

C. J. Robb, in his article, *The Rebel Minister of Saintfield in The Leader*, Feb. 10, 1945, states, 'One of the first references to Birch's political reform activities is contained in a pamphlet entitled "A True Account of Husbandry in the Northern Counties of Ireland" by "Liberty." In this publication one finds many references to the difficulties of the Irish farmer and weaver, in the way of excessive rents, poor markets, tythes, etc. The pamphlet is Belfast printed in 1785.' This is the only reference to this pamphlet which we have been able to trace.

<sup>(11)</sup> *Hibernian Magazine*: December, 1783. Ledlie and Birch Mss.

John Ledlie was a nephew of the Rev. Robert Darragh of Monaghan, 1697-1711. He and his brother, William, married sisters, daughters of Robert Hamilton of Monclon, Scarva, Co. Down. William was the grandfather of the Rev. James Crawford Ledlie, D.D., a distinguished figure in the Irish Non-Subscribing Church.



Birch refers in 1806 to his numerous family, but the only children known to us are Elizabeth, John Ledlie, Hamilton, and Thomas Ledlie.<sup>(12)</sup> This last named is buried in the graveyard behind his father's church, the headstone bearing the inscription, 'The grave of Thomas Ledlie Birch, son of the Rev. Thomas Ledlie Birch, once the faithful beloved pastor of Saintfield in whom there was no guile, 1802.'

James Ledlie, his brother-in-law and ancestor of the Wallace family of Myra Castle, Downpatrick, owned a distillery in Saintfield. He lived in the townland of Ballycloughan, near Saintfield, and it was in this townland that Birch purchased a farm in 1784. He called the farm Liberty Hill, by which name it is still known, and here he resided until 1798.<sup>(13)</sup>

It has been stated that Birch, when a student at Glasgow University, issued several pamphlets in favour of the American colonists.<sup>(14)</sup> We have failed to trace any such pamphlets, but there is no doubt that he sympathized with the colonists. In 1784 he helped to draft an address which the Yankee Club of Stewartstown sent to George Washington, expressing their joy that America had risen superior to the menaces of regal and ministerial despotism, and had thrown off the yoke of slavery. The situation in the past has caused them many anxious fears, but they assured Washington that his exertions had 'shed their benign influence over the distressed kingdom of Ireland.' Washington returned thanks, and the whole transaction was disclosed to the *Belfast Mercury* (5th October, 1784) by Birch, who mentions that the address had been transmitted to Washington by his brother-in-law, Campbell Dick, a citizen of Philadelphia.<sup>(15)</sup>

When the Volunteer movement arose to meet the threat of a French invasion, Birch was elected chaplain of the Saintfield Light Infantry. The Volunteers took an active part in the political discussions of the day, and generally speaking, were opposed to the return of Lord Kilwarlin at the Co. Down election of 1783. The Hill family were regarded as favouring the Seceders at the expense of the Synod of Ulster, so Birch supported the rival candidate, Robert Stewart, later 2nd Marquis of Londonderry who at that time belonged to a Synod of Ulster congregation.

Kilwarlin was elected, and after his return a burlesque history of the election was published in which the Saintfield minister was viciously attacked and labelled "Blubbering Birch," a title which his opponents were later to seize gladly.<sup>(16)</sup>

The last two decades of the eighteenth century saw the rise of public opinion in Ireland and the growth of a keen radical interest in political affairs. The two main political topics were parliamentary reform and Catholic emancipation, and it was to support these two principles that the Society of United Irishmen was founded in Belfast in 1791.

(12) *Northern Star*: February 13, 1794.

Birch may have included in his family William Alexander and James Paxton, the orphan grandchildren of his brother, Oliver Birch. He was appointed their guardian in August, 1802. *Orphans Court Record*. Washington, Pennsylvania, Vol. B. p. 145.

(13) Index of Lands, Co. Down. Registry of Deeds, Dublin. 383.123.253184; 515.521.335828 and 521.533.343508.

Birch purchased 42 acres of freehold land in Ballycloughan and 128½ acres of leasehold land in Cultra, Holywood, from Patrick Cleland, Ballymagee, on Sept. 8, 1784.

On July 19, 1798, he sold his Ballycloughan farm to his brother, Rev. James Birch, for £500. On March 15, 1799, the Rev. James Birch sold these lands to James McRoberts of Lis-tooder, for £1,111.

(14) C. J. Robb, *Sunday Press*, May 1, 1955.

(15) Dick, a former Stewartstown merchant, was married to a sister of Mrs. Birch. He died of yellow fever in Philadelphia in 1793. Some months earlier, December 25, 1783, the Donacloney Real Independents sent a similar address.

(16) *An Historical Account of the late Election, etc.*, p. 54.



Birch was in favour of both aims, and formed the Saintfield United Society of Irishmen on the 16th January, 1792.<sup>(17)</sup> Samuel McSkimin says, 'About this time Mr. Birch threw up his portion of the Regium Donum, then only about £10 per annum.'<sup>(18)</sup> This may be correct, but he was in receipt of it in 1798.

January, 1792, also saw the founding by a group of businessmen of a Belfast newspaper, the *Northern Star*, to spread the views of the movement. The ninth issue of the new paper gives a copy of the test, or associating principles of the Saintfield society—'I, A.B., do solemnly promise in the presence of Almighty God, that through Divine assistance. I shall endeavour to cultivate friendship with, and between persons of every religious profession, and I shall be aiding and assisting by every lawful means, in promoting the religious and civil liberties of the people of Ireland.'<sup>(19)</sup>

The early ideas of the Saintfield society are clearly set out in resolutions passed on Christmas Eve, 1792:—

1. Resolved, that we will steadily pursue every reasonable, legal, and constitutional means in our power, to obtain a more equal representation of the people in Parliament and a shorter duration of parliamentary delegation.
2. Resolved, that a radical reform in Parliament can never be affected, but by extending the rights of suffrage to all sects and denominations of Irishmen.
3. Resolved, that we look upon our brethren the Roman Catholics, as men deprived of their just rights—that we highly approve their present mode of proceeding, and sincerely and heartily wish them success.'

On Christmas Day, 1792, the Saintfield congregation held a meeting and passed almost similar resolutions:—

1. 'Resolved, that all Government does, and ought of right, to originate from the people; and its end to be the happiness of the governed.
2. Resolved, that whilst we profess ourselves attached to our present form of government, as consisting of King, Lords and Commons, we are decidedly of the opinion, that there are certain errors crept into our system (from the want of a due representation of the people in the Commons House) which cry aloud for redress!'<sup>(20)</sup>

The *Belfast News-Letter* reported, 'It was proposed at the meeting, and unanimously applauded, that the congregation, for the defence of their families and properties, shall immediately proceed to acquire the military exercise whereby, with those already in arms, upwards of 500 brave fellows will be added to the "National Guards" of Ireland.'<sup>(21)</sup>

There can be little doubt that the majority of the Saintfield congregation were deeply infected with radical ideas which owed their spread to Birch's teaching. His political views are well expressed in a sermon preached in Saintfield to his masonic brethren on St. John's Day (25th June), 1795, in which he called kings the butchers and scourges of the human race, and accused them of revelling in the spoils of thousands, whom they had made widows and orphans.<sup>(22)</sup>

<sup>(17)</sup> *Northern Star*, January 14, 1792.

There appears to be some doubt if this was the first Society of United Irishmen formed in Co. Down. C. J. Robb, writing in the *Sunday Press* (May 1, 1955) states that it was, although in an earlier article in 'Ninety-Eight' he claims that a Society was formed in Ballynahinch on December 5, 1791.

<sup>(18)</sup> Samuel McSkimin: *Annals of Ulster*, p. 5.

<sup>(19)</sup> *Northern Star*, February 1, 1792.

<sup>(20)</sup> *ibid*, December 26, 1792.

<sup>(21)</sup> *Belfast News-Letter*, January 4, 1793.

<sup>(22)</sup> *Northern Star*, June 29, 1795.

Birch's name does not appear in the Records of the Grand Lodge of Ireland. For the attitude of Ulster Freemasons towards the United Irishmen's movement see the writer's "Some Aspects of Freemasonry in the late 18th and early 19th Century", in *Transactions of the Lodge of Research*, 1958-1962.

Agnes McMillan, the only member of the Saintfield congregation to record her impressions of his teaching, wrote that Birch preached freedom and liberty. As the Rebellion of 1798 approached he urged that it was the duty of all Irishmen to unite and attack landlordism and episcopacy.<sup>(23)</sup>

Although never formally suppressed, the United Irishmen became virtually illegal in 1794. Their clubs could no longer meet publicly, and peaceful agitation gave way to armed conspiracy. Many left their ranks, and those who remained inclined more and more to republican separatism. Birch remained true to his beliefs, and in sermons and letters to the Belfast press he denounced the English link with all the adjectives at his command.<sup>(24)</sup>

Birch had told Wolfe Tone that his flock were completely converted to his views, and the congregation celebrated the French defeat of the Austrian and Prussian armies, but many were dissatisfied with his political views now that the movement was illegal.<sup>(25)</sup> At the famous Volunteer Review held in Belfast on the 4th July, 1792, to commemorate the Fall of the Bastille, Birch had urged the political claims of Roman Catholics, holding that it was criminally unjust to deprive them of the franchise, and stating that he would rather transport himself to Botany Bay than live in a country which continued to keep itself in abject slavery by its internal divisions.<sup>(26)</sup> Statements such as these did not endear him to certain of his congregation, and in 1796 these dissentients formed a Burgher Secession Congregation (Second Saintfield), a proceeding which so incensed Birch that he published a most ill-natured and slanderous pamphlet, condemning not only the Saintfield Seceders but the denomination as a whole.<sup>(27)</sup>

In the two years preceding the outbreak of the rebellion of 1798 a veritable reign of terror existed in the Saintfield neighbourhood, as indeed it did in many other districts in Ulster. Assaults, arson, murder and arrests were commonplace. Nicholas Price, the owner of the Saintfield estate, was a staunch loyalist, as befitted the Gentleman Usher of the Black Rod with a salary of £1000 per annum. He waged a relentless war against all suspected rebels in the parish, and determined to rid Saintfield of Birch.

In March, 1797, eleven of Birch's congregation were arrested on a charge of attacking the dwelling of Hugh McKee, near Saintfield.<sup>(28)</sup> They were tried the following month at the Down Assizes, and acquitted chiefly because of the scathing attack made by their defence counsel, John Philpot Curran, of the sub-sheriff, Rev. John Cleland.<sup>(29)</sup>

Birch attended the trial, and when the verdict was announced he was arrested in the court-room and imprisoned on a charge of high-treason—a capital offence.

(23) Cardwell Mss. Copy in writer's possession.

(24) For example, see *Northern Star*, January 15—March 12, 1795, for correspondence with Dr. William Bruce on the Protestant Dissenters' Address to the Lord Lieutenant.

(25) T. Wolfe Tone: *Journal*, August 15, 1792.

*Northern Star*, December 8, 1792.

(26) *Belfast Politics*, etc., 1794, p. 60.

(27) *Physicians Languishing under Disease. An address to the Seceding or Associate Synod of Ireland, upon certain tenets and practices alleged to be in enmity with all religious reformation*. pp. 47. Belfast, 1796.

(28) *Northern Star*, May 1, 1797.

One of the eleven men arrested was David Shaw, a prosperous cotton manufacturer. Shaw was again arrested in the following year, and his property was destroyed by the military after the insurrection. Steel Dickson relates in his *Narrative* that a few nights before the rebellion broke out he called at Shaw's house, 'where I got some excellent cold beef and drank one tumbler of punch.'

Hugh McKee was a cousin and brother-in-law of the Rev. Samuel Edgar of Ballynahinch, father of the Rev. John Edgar, the noted temperance reformer. On the day of the Battle of Saintfield McKee's house was again attacked and the entire family wiped out, the only atrocity committed by the insurgents in Co. Down.

(29) Sub-sherriff, magistrate, Chancellor of Lismore (Cork), Perpetual Curate of Newtownards, and Agent for the Londonderry and Price estates,



After three days he was released on bail till the Autumn Assizes, and the charge against him reduced to one of misdemeanour, which deprived him of the right of challenging the jury.

After a lengthy trial Birch was acquitted, but had to take the Oath of Allegiance, and William Campbell, in his *History*, writes: 'Mr. Justice Chamberlain, who presided in Court, expressed, in the strongest terms, his indignation at the base, malicious conduct of the prosecutor. The worthy rector of the parish, however, gave his testimony in favour of this profligate man, whom the judge represented in the light of an invidious assassin. But this infamous man had the merit of not only being an informer, but a conformist also, which must have exalted him highly in the opinion of good Churchmen. Mr. Birch was honourably acquitted.'<sup>(30)</sup>

On the 6th April, 1798, just two months before the rebellion broke out, Birch again appeared at the Assizes.<sup>(31)</sup> This time he was indicted by a Joseph Harper, charged with offering Harper £50 not to prosecute United Irishmen, and also with assaulting Harper's son, Richard. The prosecution was dropped, and Birch discharged, as Joseph Harper was dead, having been shot 'on the Tuesday preceding the Assize upon the road leading from Belfast to Saintfield.'<sup>(32)</sup>

Birch, who on the 25th April, 1798, had been elected chaplain to the United army in Co. Down, took the field with his men. The insurgents defeated the royal army in a brief but bitter engagement at Saintfield on Saturday afternoon, 9th of June, and forced them to retreat to Comber and later to Belfast.<sup>(33)</sup>

<sup>(30)</sup> William Campbell: *Sketches of the History of Presbyterians in Ireland*.

Mss. in Presbyterian Historical Society Library.

Birch's prosecutor was John Corrough, a Ballycloughan farmer whose farm adjoined Birch's. He was a scoundrel whose evidence had falsely condemned Samuel Jamison of Saintfield to death during the Hearts of Steel outbreak in 1772. Judge Chamberlain, when a barrister, had acted for the defence in another case when the evidence of Corrough, the principal Crown witness, was shown to be false.

<sup>(31)</sup> *Belfast News-Letter*, April 16, 1798.

<sup>(32)</sup> Downshire Letters, P.R.O. N.I.

<sup>(33)</sup> For a detailed account of this battle see chapter 20 of *Revolt in the North*, Dublin, 1960, by Charles Dickson.

Many of the dead of both sides were buried in the Presbyterian graveyard, which adjoins the site of the battle. Two headstones, marking the graves of rebels, are still to be seen. A mural tablet, commemorating some of those killed in the royal army, was erected in Comber Parish Church, where Birch's nephew was perpetual curate.

Part of the royal army consisted of the Newtownards Yeomanry Cavalry, commanded by Birch's brother, Dr. George Birch. Dr. Birch's two eldest sons were United Irishmen. The earliest evidence we have of their complicity with the movement is contained in a report of Colonel Stapylton of the York Fencibles, stationed at Newtownards. It is dated 10th December, 1797, and contains this extract:

'I have it by good authority that the commander of the Yeomanry in this town has two sons, John and George Birch, who are Rebels and are responsible for stealing the powder and ball from the military store. Old Birch is a royalist, and a great friend of My Lord.'

Steel Dickson in his *Narrative*, pp. 45-46, states that on 31st May, 1798, he left Saintfield to return to Belfast, but that he changed his plans and spent the night at Ballygowan. No reason is given for the change of plan, but a deposition of Dickson's in the I.P.R.O. states that when he arrived at Ballygowan there seemed to be a considerable commotion. He saw a genteel young man come running out of a public house very drunk and with his nose cut. On learning that the young man was a son of Dr. Birch, Dickson stayed with him till after seven o'clock to prevent him fighting, and then brought him home.

Both sons fought in the rebel ranks at Saintfield, and a contemporary letter, written by George A. Stewart, dated 5th July, 1798, and quoted by Alec Wilson in *Fragments that remain*, tells of the result—'The Doctor's eldest son, I hear, was shot in the engagement at Saintfield at the head of a party of rebels, and George was taken prisoner at Carlisle in the dress of a young lady accompanied by her mother and one of her sisters. I fancy he will be hanged and he will be no great loss to the community at large. Only conceive his father, who is in the Yeomanry, fighting on one side and his two sons on the other.'

Due to the influence of Dr. Birch with Lord Castlereagh George Birch was not tried, but he was compelled to go to the East Indies. He became a lieutenant in the Bengal Infantry, and died unmarried in 1808. See *Memoirs and Correspondence of Viscount Castlereagh*. London, 1848. Vol. I, pp. 392-3 and 396.



The following day, Pike Sunday, Birch preached to the whole rebel army assembled at Creevy Rocks, a nearby hill, taking for his text Ezekiel IX, 1,—‘Cause them that have charge over the city to draw near, even every man with his destroying weapon in his hand.’ He began, ‘Men of Down are here gathered to-day, being the sabbath of the Lord God, to pray and fight for the liberty of this Kingdom of Ireland. We have grasped the pike and musket and fight for the right against might: to drive the bloodhounds of King George the German king beyond the seas. This is Ireland, we are Irish and we shall be free.’

Later in his sermon he said, ‘Men of the South are in arms against the common foe. Let us go forward to the flush of victory when all hands will be joined in the bond of Irish Unity.’<sup>(34)</sup>

On Monday Birch marched to Ballynahinch with the rebel army, but later returned to Saintfield to encourage the necessary reinforcements for the pending battle. After the defeat of the rebels at Ballynahinch on Wednesday, 13th of June, Birch returned home. Here he was arrested at 3 a.m. on the 16th of June by a troop of the 24th Light Dragoons, and brought to Lisburn for court-martial, charged with treason and rebellion.

Lieut.-Colonel Blacker, in his autobiography, writing of Henry Monro’s trial, states that ‘he (Munro) conducted himself with great propriety before the Court but made no defence, indeed he seemed rather to disdain doing anything of the kind, very different from a Presbyterian minister named Birch, who was tried immediately after and entered into a long and blubbing defence, but the evidence was too conclusive and he also was found guilty . . .’

I have mentioned the conviction of Birch the minister on the same day with Monro. He was not executed, to the extreme indignation of the troops, who were very near going out and hanging him themselves, particularly those who had lost friends in the outbreak. There were some curious circumstances connected with the sparing of his life. He had a son and a brother, both active loyalists. The latter, Dr. Birch, a medical man of Newtownards, was I believe, an officer of Yeomanry Cavalry and a personal friend of Colonel Stewart (afterwards Lord Castlereagh) and of his father, the old Lord Londonderry—their loyalty and interest at headquarters was the means of saving the reverend rebel, though it was proved he had preached to the rebels at a place called Creevy, near Saintfield, on the way to Ballynahinch. The loyal doctor had a son as great a rebel as his uncle, the minister. I never heard what became of him.<sup>(35)</sup>

Blacker’s account of Birch’s court-martial illustrates the danger of relying on a writer’s memory when he is describing events many years later. Ignoring his misstatements that Birch had a son who was a loyalist and that Dr. Birch had only one rebel son, it is strange that Blacker should state that it was proved that Birch preached to the rebels at Creevy Rocks and that he was convicted.

The transcripts of the court-martial still exist in the State Paper Office, Dublin, and no mention is made in them of Birch’s activities at Creevy Rocks, while the verdict of the court reads—‘The court having taken into their consideration the evidence against the prisoner and his defence are of opinion that evidence is not

---

<sup>(34)</sup> Quoted by C. J. Robb in the *Sunday Press*, May 1, 1955. The source of the quotation is not given.

<sup>(35)</sup> *Ulster Journal of Archaeology*. Third Series, I, pp. 197-8,

sufficiently strong to affect the prisoner's life and therefore acquit him of the crimes laid to his charge.<sup>(36)</sup>

Blacker, however, is correct in stating that Birch owed his life to his brother's influence. Dr. Birch told his brother, prior to the court-martial, that the court would acquit him if he would offer to go into exile. Birch agreed, and to secure a favourable verdict addressed the court as follows—'Gentlemen, I may have done wrong, but it was in error. I love my king and country and shall ever pray for their happiness. I have the most perfect confidence in the justice and humanity of this court and most cheerfully resign my honour and life to its disposal, and sensible that I cannot be any longer happy or useful in this country, I shall, when ordered by General Goldie or any other person authorised to order me, quit his Majesty's Dominions never to return without subjecting myself to such punishment as is inflicted on persons returning from transportation without leave, and retire to America or some other country not at war with his majesty.'

Birch was apparently considered too dangerous to be released from custody, and after the court-martial he was imprisoned in the guard-house in Lisburn. The following day a party of yeomen approached the guard-house with the intention of taking Birch out to hang him, but their plans were thwarted by a troop of the 22nd light dragoons, who formed up in the street outside and forced the yeomen to retreat.

Two days later Birch was taken under guard to Belfast, and on the 19th of July, 1798, he was sent on board the prison-tender in Belfast Lough.<sup>(37)</sup> Conditions on the ship were far from ideal, as so many prisoners were sent on board that it became overcrowded. To overcome this difficulty a false deck was put in between the other two. 'The head room was so confined,' Birch later wrote, 'that in walking you must crouch with your hands upon your knees. There was however, this advantage, that as chairs and tables were scarce, being no room for them, the deck served the purpose of both.

No prisoner was permitted to retain a razor or knife of any sort, lest he should cut through the ship's timbers; forks were also forbidden, as they might be converted into pikes. Some beef in a bucket was handed down for dinner, and upon a humble petition a jack-knife was granted by the provost sergeant to the carver-general of sixteen, to be immediately returned and a fork of Adam's manufacture to hand round the repast. If any gentleman was not pleased he had (until) the next meal to come to his temper.

The beds were of canvas, stuffed with hair from the tan yard, which gave forth such a quantity of lime dust in the confined compartment, as not to be altogether palatable to weak lungs. However, it dispersed the flies. Two small port holes with an iron railing on each side, set in a wall thirty feet long, served for the purpose of windows. The heat was so intolerable, that, even without any covering in the night,

---

<sup>(36)</sup> Birch's court-martial began on Monday, 18th June, and lasted three days. Twenty-seven witnesses were called. Of the five principal crown witnesses one was an army pensioner, and four were arrested rebels. One of these rebels, Francis Henry Gordon, was a member of the Saintfield congregation. His late father, Alexander Gordon, had been agent for the Price estate. Gordon had fought at Saintfield, and had charge of the rebel artillery at Ballynahinch. He was arrested, but was allowed to emigrate to America. He was drowned in an accident in Lake Ontario. His mother, a sister of the Rev. Arthur McMahon of Holywood, who had to flee to France in 1797 because of his treasonable activity, gave evidence on behalf of Birch.

<sup>(37)</sup> Other ministers on the ship included William Steel Dickson, Portaferry; James Simpson, First Newtownards; William Sinclair, Newtownards N.S.; Robert Steele, Scruggan; and John Wallace and David B. Warden, licentiates.



the shirt would be wet with sweat. The air was so confined that the utmost attention to cleanliness could not prevent vermin from occasionally appearing.'<sup>(38)</sup>

The prisoners were seldom allowed above deck, and Birch relates that but for the humanity of Lieutenant Steel, who permitted the prisoners on deck when the commanding officer was absent, fever which had broken out would probably have spread.

Birch was released on the 16th August, 1798, to sail from Belfast to New York on board the *Harmony* of New Bedford, and reached the New World in September.'<sup>(39)</sup>

Early in 1799 Birch moved to Philadelphia, where he officiated for several months at the Third Presbyterian Church. Later the same year he acted as supply to the congregation in East-Nottingham. In the following year he was invited by some former members of the Saintfield congregation to found a congregation at Washington, Pennsylvania. He accepted, and 'removed there, at great expense, as a place adapted to a stranger in my situation, with a numerous family, and the small wreck of a desolated fortune.'<sup>(40)</sup>

On 23rd October, 1800, he appeared at a meeting of the Presbytery of Ohio, asking to be taken under their care and settled in the congregation. One of the credentials presented by him was the following from the Presbytery of Belfast—'This is to certify, that the Rev. Thomas Ledlie Birch was a member of the Presbytery of Belfast, and minister of the Presbyterian congregation of Saintfield, in which station he maintained a good moral character, and was much respected by his congregation'<sup>(41)</sup>.

To his surprise, his request was refused on the grounds of want of experimental knowledge, i.e., 'knowledge of the grounds of religion, and the ability to defend orthodox doctrine, against all unsound and erroneous opinions.'<sup>(42)</sup> Similar requests were rejected in January and March of the following year, so in May, 1801, Birch appealed to the General Assembly.

<sup>(38)</sup> Thomas Ledlie Birch: *A Letter from An Irish Emigrant to his Friend in the United States. Giving an account of the Commotions in Ireland, of the United Irishmen, and Orange Societies, and of several Battles and Military Executions*, Philadelphia, 1799, 56 pp.

In this pamphlet, written in New York in 1798, Birch paints a vivid picture of the uneasy conditions in Saintfield and district in the years prior to the rebellion and gives a full account of his trial, attempted lynching, and imprisonment.

<sup>(39)</sup> One of the other sixty-four passengers was William Kane, a former clerk in the *Northern Star* office. He had fought at Ballynahinch, and had been captured with Henry Munro.

<sup>(40)</sup> Where the source is not given, the information in this and subsequent paragraphs is taken from *Experimental Religion, Instructors Unexperienced—Converters unconverted—Revivals Killing Religion—Missionaries In Need of Teaching—or War against the Gospel by its Friends*. Being the Examination and Rejection of Thomas Ledlie Birch, a foreign ordained Minister, by the Rev. Presbytery of Ohio, under the Rev. General Assembly's Alien Act; The Trial and Acquittal of the Rev. Presbytery of Ohio, before the very Rev. General Assembly of the Presbyterian Church of America, for the Rejection of Birch; and Injustice in permitting the Rev. John McMillen to escape Church Censure. With Remarks thereon, Addressed to the Friends of Gospel Progress, More particularly, those of the Presbyterian Church of America. Rev. Thomas Ledlie Birch, A.M. 144 pp., 1806.

<sup>(41)</sup> The credentials, which were dated July 21, 1798, bore three signatures—Rev. Sinclair Kelburn of Rosemary Street, Belfast; Rev. Samuel Patton of Moneyrea, and Rev. Alexander Henry of Castlereagh.

Henry, in 1794, was indicted at Downpatrick Assizes, on the affidavit of Robert Leatham, for using seditious expressions tending to vilify the king, but was acquitted.

Kelburn was imprisoned in Kilmainham, 1797-9, accused of complicity in rebellion.

<sup>(42)</sup> Robert Steele of Scriggen had an almost similar experience. He applied to the Presbytery of Redstone, Western Pennsylvania, on June 26, 1799, to be taken on probation. His request was refused, 'the Presbytery not having received all the satisfaction from Mr. Steele which they desired on the subject of experimental religion.' Similar requests were refused in June, 1800 and April and October, 1801, and it was not until April, 1802, that the Presbytery agreed to receive him as a member. In October, 1802, he accepted a call to First Pittsburgh Presbyterian Church, where he ministered until his death on March 22, 1810.



When the complaint was heard Birch had the sympathy of the Assembly, as he had been pastor of a large church in his native land and was well advanced in years. Some of the oldest and ablest members of the Assembly espoused his cause with great zeal, and in no measured terms denounced the injustice or uncharitableness of the Presbytery.<sup>(43)</sup>

The Assembly was on the point of passing a vote of censure on the Presbytery, and of requiring them to receive Birch, when the Rev. John Watson rose in defence of his Presbytery. In a brief speech Watson defended the right of the Presbytery to judge whether or not a candidate for the ministry was acquainted with experimental religion; and argued that even if they had decided erroneously they were responsible only to God and their consciences.

Watson's speech changed the views of the Assembly, and it was agreed 'that no evidence of censurable procedure in the Presbytery of Ohio in the case of Mr. Birch had appeared in this House, inasmuch as there is a discretionary power necessarily lodged in every Presbytery to judge of the qualifications of those whom they receive, especially with respect to experimental religion.'<sup>(44)</sup>

Birch's friends then induced the Assembly to examine him as to his acquaintance with experimental religion, and the Assembly found 'no obstruction against any Presbytery to which he may apply, taking him up and proceeding with him agreeably to the rules and regulations in this case made and provided.'<sup>(45)</sup>

The Clerk of the Ohio Presbytery at the period of Birch's attempts to gain admittance was the Rev. Dr. John McMillan, 'whose failing all his life was a little too much bluntness of manner and expression, and who hated everything like hypocrisy and ministerial inconsistency.'<sup>(46)</sup> McMillan, the father-in-law of the Rev. John Watson, had expressed to the Presbytery his candid and unflattering opinion of Birch, and was the instigator in having him refused admittance.

When Birch learnt of McMillan's remarks he brought him before the Presbytery to answer for slander and unchristian threatenings. The Presbytery acquitted their clerk of these charges, except that of calling Birch 'a preacher of the devil,' for which they reprimanded him.<sup>(47)</sup> Dissatisfied with the verdict Birch gave notice of appeal to the General Assembly, 'but apprehending that he should not obtain a favourable decision, in consequence of his having committed some irregularities in Washington County, by administering the sacrament and ordaining elders in violation of the rules of the church, he gave up his appeal, and withdrew from the jurisdiction of the General Assembly; after which, the Assembly determined that they would have nothing more to do with him, and that he never had been in union with the Presbyterian church in the United States, so as to be authorized to preach as one of their ministers'<sup>(48)</sup>.

But McMillan had not yet heard the last of Birch, who brought an action of

(43) Wm. B. Sprague: *Annals of the American Pulpit, etc.*, New York, 1859. Vol. IV, p. 209.

One of Birch's principal supporters was the Rev. Ashbel Green, minister of the Second Presbyterian Church, Philadelphia, 1787-1812.

In a letter to Green, now in the library of the Historical Society of Pennsylvania, and dated May 27, 1803, Birch wrote, 'I intend publishing a collection of psalmody, from the Old and New Testaments, framed upon the sacred text alone, without hymns, in which there (is) ground for the happy prospect of the union of Seceders and all orthodox Christians.'

We have failed to trace any reference to the publication of this book.

(44) W. B. Sprague, *Op. Cit.*, p. 209.

(45) *Minutes of General Assembly of 1801.*

(46) Joseph Smith. *Old Redstone, or Historical Sketches of Western Presbyterianism, its early ministers, its perilous times and its first records.* Philadelphia, 1854. p. 195.

(47) *ibid.* p. 196.

(48) Horace Binney: *Report of Cases adjudged in the Supreme Court—Pennsylvania.* Vol. 1, p. 179.

slander against him for calling him 'a liar, a drunkard, and a preacher of the Devil.' Birch also sued two elders of the Washington congregation for slander, and the three cases were tried jointly at the Circuit Court of Washington County in October, 1804.

Among the testimonials which Birch offered as proof of good character was the following—'We, the Synod of Ulster at our annual meeting at Cookstown, June 29, 1803, moved by a sense of justice, think ourselves in duty bound to give our attention and testimony, as we hereby do, to the character of our esteemed brother, the Rev. Thomas Ledlie Birch, of Washington, in America. He was a sober, respectable member of this body for above twenty years, particularly remarkable for piety, charity, and inflexible integrity; for a warm zeal for the interest and prosperity of the church of Christ, and for an assiduous and faithful discharge of the duties of the ministerial office. Thomas Henry, Moderator.' Similar testimonials were presented from the Presbytery of Dromore and the congregations of Tullylish and Saintfield.<sup>(49)</sup>

McMillan admitted the charge, but pleaded that the expressions were privileged, as they were spoken by him in Presbytery, while making his defence against Birch's charge, and were not objectionable. He also pleaded that the action could not be maintained by Birch for words spoken of him in his profession of minister of the Presbyterian Church, because the evidence showed that he did not hold that office.

The jury found against the three defendants. Birch was awarded 300 dollars against McMillan, and 150 dollars and 70.25 dollars against the elders, with costs in each case.

McMillan's appeal was heard before the Supreme Court of Pennsylvania on September 18, 1806, and was upheld on the grounds that the rights of ecclesiastical courts are established by long custom, and that the constitution guaranteed protection to churches in the exercise of discipline, and in the administration of their rules and regulations, so long as they do not attempt to infringe upon civil rights, or inflict temporal pains and penalties.<sup>(50)</sup>

After his defeat in the Supreme Court Birch becomes a shadowy figure. He applied on June 16, 1802, to be taken under the care of the Presbytery of Huntingdon, Pennsylvania, but this request, and a similar one in the following year, was rejected<sup>(51)</sup>. However, at a later date he was received as a member of the Presbytery of Baltimore, although he lived outside their bounds.

On February 25, 1804, Birch purchased a 274 acre farm, Point Pleasant, situated about five miles west of Washington, Pa.<sup>(52)</sup> Here he lived until at least 1819, as the Washington *Examiner* mentions his officiating at a wedding in June of that year.

He died near Freeport, Armstrong County, Pa., on April 12, 1828. His widow died in Cadiz, Ohio, on November 25, 1836, aged 76, and a son, Hamilton, died there on March 27, 1847, aged 60.<sup>(53)</sup>

(49) It is interesting to note that the Synod minutes make no reference to this resolution. The minutes of the Presbytery of Dromore and the sessions of Tullylish and Saintfield for 1803 are not extant.

(50) Horace Binney: *Op. Cit.*, p. 188.

(51) William J. Gibson: *History of the Presbytery of Huntingdon (Pa.) Bellefonte (Pa.)*, 1874, p. 48.

(52) Office of Recorder of Deeds, Washington, Pa. Deed Book I—S—p. 293.

(53) Washington *Examiner*: May 24, 1828 and December 17, 1836. Cadiz Cemetery records.

C. J. Robb, writing in *The Leader*, February 10, 1945, states 'The Rev. Hugh Lamont, who formerly hailed from Kilrea, Co. Derry, a Covenanter, in his "Personal Recollections, etc.," published in Boston in 1834, says "Thomas Ledlie Birch called me to his death bed and in the course of conversation said, "Thank God I have lived to die in a free country."'

In answer to a query of mine about the Rev. Hugh Lamont, Professor D. M. Carson of Geneva College, Beaver Falls, Pa., the historian of the Reformed Presbyterian Church in the U.S.A., wrote, "The records of the Reformed Presbyterian Church reveal no such person on its rolls."

A query to the Boston Public Library brought the reply that no book, pamphlet or article by the Rev. Hugh Lamont could be traced.



2nd May, 1963

**D'ARCY THOMPSON AND THE PROBLEM OF FORM  
LARMOR-ALLWORTHY MEMORIAL LECTURE**

PROFESSOR P. B. MEDAWAR, C.B.E., M.A., D.Sc., F.R.S.

Dr. Medawar said it was very much a sign of the times that two of the three scientists so far chosen to give the Larmor-Allworthy Lecture had been biologists, though the names that the Society commemorated in the Lecture were those of a mathematical physicist and a physician. Dr. Medawar said that he did not believe in the distinction commonly drawn between the biological sciences on the one hand and the exact or quantified sciences on the other—in the existence of two Cultures within science itself. Nobody had done more to dissolve the distinction than D'Arcy Wentworth Thompson, Professor of Natural History at St. Andrew's for 64 years—biologist, classicist and mathematician.

The 'Problem of Form' Dr. Medawar would discuss was D'Arcy Thompson's problem of form—the problem of the description and comparison of organic forms—and he introduced his lecture with two texts, the one from D'Arcy Thompson's **Growth and Form** declaring that the mathematical analysis of form was possible, the other from Professor D. M. S. Watson saying that it was not. In point of fact, D'Arcy Thompson professed to be able to do something he never did, viz., to describe organic forms in a numerical language, while Watson denied that mathematics could do the very thing that D'Arcy Thompson accomplished, viz: the mathematical **comparison** of forms.

The two problems were quite distinct. Complex shapes were for all practical purposes beyond algebraical formulation, though such a formulation was always possible in principle. Dr. Medawar illustrated the point with photographs of a number of rather beautiful mathematical models in the British Museum representing the geometrical 'interpretation' of a number of complex formulae. But it was possible to describe **change** of shape exactly even if the shape undergoing transformation were itself beyond algebraical description. Thus the change of co-ordinates that could transform a circle into an ellipse could do as much for an outline drawing of a human face or of a fish. D'Arcy Thompson had shown that when related organisms differed in a multitude of particular little ways, they might yet have been changed one into the other by a comparatively simple transformation, which he illustrated by drawing the outlines of an organism on the square grid of ordinary graph paper, and then distorting the grid in various simple ways. The weakness of D'Arcy Thompson's method was that he compared the shapes of organisms as if he were comparing two lantern slides or still pictures: it was essential to make the method kinematic, to make a movie-like representation of change of shape, and Dr. Medawar showed that he himself had made some small progress towards this end.

Speaking more generally of transformation, Dr. Medawar said that the definition of a set (more properly a group) of transformations was at the same time a definition of the variant (changeable) and invariant (fixed) properties of the figures undergoing those transformations. Thus if a lantern screen were tilted out of its true position, the image thrown on it would be distorted in various ways: some characteristics (e.g. circularity or parallelism) would alter and thus lose their meaning in a world of such 'projective' transformations, but others (like linearity) would be unaltered—a straight line would remain a straight line no matter how the screen was tilted. In comparative anatomy, the idea of 'homology' had a central position. Homology was the anatomical correspondence of parts, e.g. the correspondence of wings with arms and with the



forefins of fish. Homologous relations were the invariants of evolutionary transformations. The most general mathematical transformation preserving homology was that studied in the branch of geometry known as 'topology.' Topological transformations preserved only continuity and the correspondence of point for point—but for that reason they did preserve relations of connexity, of 'insideness' and 'outsideness,' of the number of closed spaces within a figure, and so on. Figures so related were described as **homeomorphic**; very roughly speaking, animals belonging to one phylum were homeomorphic—they were the same **kind** of animal in general design. Unfortunately, the transformations that occurred in development went far beyond what lay within the competence of topology: there was real **increase** of complexity in development. Dr. Medawar said that it was necessary to devise a new language for describing and comparing degrees of complexity: possibly information-theory might provide the answer, but he doubted it. The whole problem was a challenge to a new generation of mathematically-minded biologists.

11th February, 1964

**IRISH-SCOTTISH RELATIONS IN THE SEVENTEENTH CENTURY**

PROFESSOR J. C. BECKETT, M.A., M.R.I.A.

The long and close connection between Irish and Scottish history has its basis in geography. The North Channel is sometimes rough and occasionally dangerous; but the crossing is short enough to be practicable for open boats, and from the earliest times there has been easy and frequent intercourse between the two countries. The influence of this geographical factor has expressed itself in various ways, according to the political conditions prevailing in the British Isles as a whole. During the medieval period these conditions were fluctuating and uncertain. From the twelfth century to the sixteenth, when Ireland was the scene of a long-drawn-out struggle between a native Gaelic culture and the centralizing power of the English monarchy, it was natural that Scotland, which had its own quarrel with England, should be a source of supply and sometimes a place of refuge for native Irish leaders. From the thirteenth century onwards heavy-armed footmen from the Western Isles, the gallowglasses, played a major part in Irish warfare—they were, says Curtis, 'the one part of an Irish army which could be trusted to stand its ground to the end.' The Bruces' attempt to bring all Ireland permanently under Scottish influence ended in failure, when Edward Bruce was defeated and killed at the battle of Faughart (1318); but Scottish monarchs continued to keep an eye on Irish affairs and occasionally tried to turn them to their own advantage. Even the cautious James VI maintained secret relations with Hugh O'Neill while he was in rebellion against Elizabeth.

The internal political condition of Scotland itself was in one respect not dissimilar from that of Ireland. For in Scotland also there was an almost continuous struggle between a centralizing royal government and the local independence of Gaelic chieftains, whose cultural tradition and political organization had close links with the native Irish. It is a matter of some significance that the part of Ireland in which Gaelic power lasted longest was the province of Ulster, which could most easily maintain intercourse with the western highlands and islands of Scotland. Down to the end of the sixteenth century the history of Irish-Scottish relations is very largely concerned with the politics of the 'Celtic fringe'—with family and clan rivalries, and with the defence of local independence against central authority.

The opening of the seventeenth century brought a fundamental change in the position. The combination of England, Ireland and Scotland in a single monarchy gave a new unity to British politics, and meant that the government of the whole British Isles was bent, in the last resort, to serve the ends of a single interest. The immediate importance of this for Irish-Scottish relations was greatly increased by the fact that it coincided in time with the completion of the Tudor conquest of Ireland. A few days after Elizabeth's death Hugh O'Neill finally submitted to Mountjoy, the Nine Years' War was at an end, and the authority of the Dublin government was for the first time effective throughout Ireland. The destruction of Gaelic power in Ulster would, in any case, have tended to weaken the semi-independent chieftains of Western Scotland; but their position was more seriously threatened by the fact that the governments on both sides of the North Channel now served a common master and were directed to a common end. The power of the crown in both kingdoms was correspondingly strengthened. It could use Irish bases and Irish resources in its operations in the Western Isles, as in Sir John Campbell's expedition to Islay in 1614; and

it could call in Scottish help to meet any new threat in Ulster, as when the Scottish council sent across 200 troops during O'Doherty's short-lived rising in 1608.<sup>1</sup>

It must not be supposed that co-operation between the Scottish and Irish governments was close, continuous, and effective. The character of seventeenth-century administration made such a development almost impossible. It was, for example, in the interest of both governments that cross-channel communications should be supervised.<sup>2</sup> But repeated attempts to enforce a passport system came to nothing: thieves, murderers, 'sturdy beggars,' (and in the later part of the century) covenanting ministers, seem to have passed and re-passed freely from one country to the other. It is true that the task of supervision was very difficult, for on both sides of the channel there were innumerable creeks and coves quite adequate for the small craft in which the crossing was generally made. Yet it is difficult not to believe that closer co-operation would have produced better results. In spite of this sort of failure, however, the possibility of joint action in times of crisis remained a factor of great importance throughout the century, witness the Scottish intervention in Ulster in the 1640's and the readiness of the Irish government to intervene in Scotland in the 1670's.

Probably the most significant result of the union of the crowns for the future of Irish-Scottish relations was the establishment of a new Scottish settlement in Ulster. There had long been in north Antrim a settlement of MacDonnells, who, being Gaelic and Roman Catholic, had mingled fairly easily with the native population. But the new-comers of the early seventeenth century were protestant lowlanders, and they brought a fresh element into the life of the Province. The way was opened by Hugh Montgomery, laird of Braidstane, who had contacts with Ireland through his brother, Thomas, a ship-master trading between Scotland and Carrickfergus. Through this brother Montgomery struck a bargain with Con O'Neill of Clandeboye, an unfortunate and somewhat shiftless landlord, who held some 60,000 acres in north Down. O'Neill was in trouble with the government and Montgomery, who had some influence with King James, offered to secure his pardon in return for half his estate. The bargain was completed in form—that is, O'Neill got his pardon, and a grant of half his estate was made out in favour of Montgomery; but before the latter could take possession another ambitious Scot, James Hamilton, whose influence with the king was apparently greater than Montgomery's, induced James to make an entirely new settlement, by which the whole of the Clandeboye estate was divided, more or less equally between O'Neill, Montgomery, and Hamilton himself. Con O'Neill proved no match for his new neighbours, and within a few years they had got possession of almost all that the royal settlement had left him.<sup>3</sup> But if Montgomery and Hamilton were not always scrupulous in their methods, they were able and energetic colonizers. Their estates, which were waste and depopulated when they took possession of them, soon flourished. They brought in stock, they planted settlers, they built houses, they founded or re-founded towns. The prosperity of north Down, as well as its strongly Scottish character, has its origin in their labours.

These settlements in County Down, and other settlements undertaken about the same time in County Antrim, were the work of individual adventurers. But over most of the rest of Ulster a more grandiose scheme of colonization was being organised

<sup>1</sup> By a curious coincidence, it had been arranged, shortly before O'Doherty's insurrection broke out, to send some hundreds of troops from Ireland to Scotland. (Privy Council to Chichester, Apr. 26, 1608 (*Cal. S.P., Ire.*, 1606-8, p. 487)).

<sup>2</sup> Chichester to Privy Council, Apr. 11, 1608 (*ibid.*, p. 470); *Register of the Privy Council of Scotland* (3rd series), i. 439-42.

<sup>3</sup> D. A. Chart, 'Break up of the estate of Con O'Neill,' in *Proceedings of the Royal Irish Academy*.



directly by the crown; and in this also the Scots played an important part. The opportunity for this project was provided by the secret flight of O'Neill and O'Donnell. After O'Neill's submission to the crown in 1603 they had received a free pardon; O'Neill had been confirmed in his earldom of Tyrone and O'Donnell had been created earl of Tyrconnell; both had retained possession of their vast estates, covering between them the greater part of the Province of Ulster. But dissatisfaction with their loss of independence, and uneasiness about the future, led them to take flight to the continent in September, 1607. This was regarded by the government as clear evidence of treason; their lands were declared forfeit to the crown; and plans were quickly drawn up for planting them with protestant settlers. It was James's intention that his Scottish subjects should take part in this great work, and in March, 1609, the Scottish council received instructions concerning the allocation of lands to suitable 'undertakers.' In the following year it was relieved of this responsibility, and the direction of the whole plantation, Scottish as well as English, was concentrated in London. But there is no indication that this change did anything to discourage Scottish settlers; and especially in the early days of the plantation a large proportion of the tenant-farmers, even on estates granted to English undertakers, seem to have been lowland Scots. So great was the attraction of Ireland, indeed, that Scottish landlords complained that holdings on their estates were being left vacant, and in 1636 the council issued a proclamation forbidding the passage to Ireland of any tenant or labourer without a certificate from his landlord or from a justice of peace.<sup>4</sup>

One natural result of the plantation was a great increase in cross-channel traffic. As early as 1612 there were complaints that shipmasters on the west coast were taking advantage of this to raise their charges; but attempts to restrain them proved, as might be expected, abortive, and the same complaint is made again in 1627. Despite the increase in traffic the facilities for transport remained primitive. The most popular route was that from Port Patrick to Donaghadee; but Port Patrick had neither quay nor harbour, so that the crossing had to be made in small open boats that could be drawn up on the shore. In the 1630s an attempt was made to raise money by public subscription to build a proper landing-place; but the response was very slight, and Port Patrick had no quay until the eighteenth century. Donaghadee seems to have had a harbour of some sort as early as 1616; but since the largest ships mentioned in connection with it are only of ten tons burden, it must have been of very modest dimensions.<sup>5</sup>

We may assume that the increased traffic between Scotland and Ireland reflected an increase in trade; but it is impossible to assess its volume. Some, perhaps much, of it was certainly a smuggling trade. The Ulster plantation soon had an exportable surplus of agricultural produce, for which Scotland was the most convenient market. It was the policy of the Scottish government, however, to exclude such commodities, at least until the price of home produce had reached a certain level; and throughout the century repeated attempts were made to prevent the importation of 'victual' from Ireland. The very frequency with which new sets of regulations were issued bears witness to their ineffectiveness. Ulster farmers could under-sell the Scots even in their own home market; it was impossible to guard the whole coast; and no penalties could prevent shippers and merchants from engaging in what must have been a profitable trade. The present paper is not concerned with the economic aspects of this state of affairs; and it is brought forward only as another illustration of the close connection between Ulster and Scotland and of the impossibility of keeping it under governmental control.

<sup>4</sup> *Register of the Privy Council of Scotland* (2nd series), vi. 198.

<sup>5</sup> J. Stevenson, *Two Centuries of Life in Down*, pp. 246-52.

This frequency and ease of intercourse meant that the Scottish settlement in Ulster was not so much a separate colony as an extension of Scotland itself. It is significant that when the Scottish council was considering a fresh scheme for the control of cross-channel traffic, in 1624, it negotiated, not with the Irish government in Dublin, but directly with the leading Scottish landlords in north-east Ulster. Quite apart, however, from any such administrative action, Scots on both sides of the channel had common interests, and might, should occasion require it, unite in a common purpose. It was the sharpening of religious controversy in the 1630s that first brought this community of interest to significant expression.

One main purpose of the Ulster plantation was to strengthen the protestant population, and for this purpose Scottish protestants were as acceptable as English. To begin with, settlers from Scotland had no trouble with the established church in Ireland, despite the ecclesiastical differences between the two countries. The tone of the Irish church was at this time strongly puritanical, indeed Calvinistic; the Ulster bishops, some of whom were themselves Scots, made no attempt to enforce the act of uniformity strictly; and Scottish ministers were allowed to hold benefices with scant regard for the book of common prayer. So secure did they feel that they even took the offensive; Robert Blair, of Bangor, when called upon by the bishop to preach at the triennial visitation of 1626 delivered a sermon on the unscriptural character of episcopacy.<sup>6</sup> The extension of Laudian influence to Ireland under Wentworth's government put an end to this easy toleration, and in 1636 five of the more determined nonconformists among the Scottish ministers were deprived of their livings. Most of them retired to Scotland, whither they were later followed by others of similar views; and their influence helped to strengthen the opposition that Laud's policy was arousing there also. When this opposition took form in the National Covenant of 1638 the solidarity of Scots on both sides of the channel was clearly shown; not only was the covenant signed by Ulster Scots in Scotland at the time, but copies were soon being circulated for signature in Ulster also. Neither in Scotland itself, nor among the Scots in Ulster, did the covenant gain unanimous support, but it did provide the basis for an ecclesiastical alliance between the two areas; and it was this alliance that gave special significance to Irish-Scottish relations during the remainder of the seventeenth century.

The complicated train of events between 1638 and 1660 cannot here be followed in detail. The Irish insurrection of 1641, beginning among the native Irish of Ulster, helped to precipitate the civil conflict towards which England was already moving; and the whole of the British Isles was soon plunged into the 'War of the Three Kingdoms,' which lasted with brief intermissions until Cromwell imposed an uneasy peace in 1651—a peace that proved to be a prelude to the restoration of the monarchy in 1660. For our purpose, it is enough to note that these years saw the consolidation of the Ulster Scots as a community distinct both from the native Irish and from the English settlers, and saw also the strengthening of their links with Scotland.

The very dangers that threatened them contributed to these ends. The outbreak of insurrection in October, 1641, drove hundreds of refugees across the channel, where they spread their tales of terror, and aroused the sympathetic anger of their compatriots. Public subscriptions were raised for their relief, and preparations set on foot, by agreement with the English parliament, for sending 10,000 troops to Ulster. Delays in the negotiations with parliament held things up, and it was not until April 3, 1642, that the first contingent, 2,500 strong, landed at Carrickfergus, under Major-General Robert Munro. By the following August, when Alexander Leslie, earl of Leven, took over the command, the full complement of 10,000 men had arrived, and the effective strength of the army was further increased by the co-operation of forces

---

<sup>6</sup> J. S. Reid, *Presbyterian Church in Ireland* (ed. Killen), i. 132.



raised locally among the Ulster Scots. Though its operations were confined to Ulster and though it suffered a crushing defeat by Owen Roe O'Neill at Benburb in June, 1646, this army played an important part in the Irish wars throughout the 1640s, and its presence gave the Scottish community in the north a political importance that it could not otherwise have had.

It was hardly less important that the arrival of a Scottish army crystallised the ecclesiastical position. The ministers who accompanied Munro's advance force as chaplains set up sessions in four of the regiments, and then constituted a presbytery, which held its first meeting on June 10, 1642, at Carrickfergus.<sup>7</sup> The example proved infectious. There was an immediate and widespread demand among the Scottish settlers, even from some who had formerly supported Wentworth, for a general establishment of the Presbyterian system; and in July a petition claiming to represent the wishes of 'the most part of the Scottish nation in the north of Ireland' was addressed to the general assembly at St. Andrews, asking that more ministers might be sent over. Presbyterianism thus emerged as the distinctive characteristic of the Ulster Scots. When the restoration of the monarchy brought with it the restoration of authority to the church of Ireland they were no longer, as in the early years of the century, a somewhat uneasy group within the establishment, but an effectively-organised rival church, with which no compromise was possible. In the conditions of the time this was bound to be of more than merely ecclesiastical significance; and throughout the restoration period the attitude of the Ulster presbyterians was a source of anxiety not only to the Irish government but to the Scottish government as well.

The re-imposition of episcopacy on the Church of Scotland in the 1660s kept much of the country in a state of almost constant disturbance. The bitterest opposition came from those who refused to be satisfied with toleration (or 'indulgence'), and demanded the full execution of the covenant. The fact that the main centre of the militant covenanters was in the south-west meant that the Scottish government could not ignore the danger presented by Presbyterian Ulster, both as a source of supply and as a haven of refuge for actual and potential rebels. The Irish government, already uneasy about the state of the north, was equally alarmed at the possible influence of Scottish example; for though the Ulster presbyterians had much less to complain of than their co-religionists in Scotland, they were by no means reconciled to the ecclesiastical settlement of the restoration. The English government was hardly less concerned than those of Scotland and Ireland; for though the Presbyterian party in England was politically weak, there was a hard core of disgruntled republicans (independents and anabaptists for the most part) who engaged in almost ceaseless plotting against the restored monarchy. At first sight, these men (Ludlow, Desborough, Roger Jones and their like) might seem to have little in common with those who supported the covenant. But conspiracy makes strange bedfellows, and their common hatred of episcopacy was a basis of co-operation more than sufficient to excite the alarm of the English government.

Col. Thomas Blood's plot in Ireland in 1663 indicated the kind of combination to be feared. The leaders were Cromwellian soldiers, but they had some support also among the Presbyterians and tried to enlist more by combining with their promise of religious toleration a promise to accept the Solemn League and Covenant. Though the first step planned by the conspirators was the seizure of Dublin Castle, there can be little doubt that if it had succeeded it would have been the signal for risings in England and Scotland as well as in Ulster. Throughout the restoration period the fear of such concerted action against the monarchy was kept alive by reports to government and by popular rumours. No doubt many of these reports were exaggerated, and some were invented—in the general atmosphere of suspicion that

<sup>7</sup> Reid, *Presbyterian Church in Ireland*, i. 372.



existed the trade of informer was a ready refuge for the unscrupulous. But the frequency with which we find these reports and rumours associating the Presbyterians of Scotland and Ireland with the 'fanatics' of England suggests that there was a genuine fear of such a combination. The news of the Pentland rising of 1666 was followed at once by precautionary measures throughout the north of England, the Mayor of York even going so far as to impose a ten o'clock curfew on the citizens. This fear was particularly strong in the early part of the period; but as late as 1683 Ormonde was persuaded that the Rye House plot must have an Irish side to it, 'considering how many dissenters were in a body in the north . . . and the correspondence held betwixt that sort of people in the three kingdoms.'

This sense of common danger might have been expected to produce some co-ordination of policy between the three governments; but in fact such co-ordination was often lacking, and its absence sometimes extended the risk of disturbance. Any increase of severity in the treatment of the Presbyterians in either Scotland or Ireland usually had its first effect on the more extreme among their leaders, and especially the ministers; when they found themselves in danger in one country they took refuge in the other, and continued their work there. Thus, at the very beginning of the restoration period the threat to the Ulster Presbyterians led several of their ministers to move over to Scotland, and this probably accounts for an act passed by the Scottish parliament in February, 1661, forbidding 'persons of all sorts' to come from Ireland without passes, a measure which Wodrow interpreted as being intended to 'prevent the retiring of the Scots Presbyterians in the north of Ireland to their native country, now when they are beginning to feel the fury of the prelates there.'<sup>8</sup> The ineffectiveness of the restriction is shown by the fact that in the following September the council was trying to secure the arrest of Irish ministers who, despite the act, had arrived in Clydesdale. Again, in 1663, we find Ormonde proposing a policy that would certainly have increased the exodus to Scotland. At the time of Blood's plot he had arrested as many as he could lay hands on of 'the Scottish silenced ministers in the north,' though without quite knowing what to do with them. After some delay, he decided to release those who were willing to give bonds to leave the kingdom and not return without permission; and this, of course, meant that they would go to Scotland, as Ormonde himself seems to have realised. At this point the English government intervened, and though Ormonde defended his policy on the double grounds that the ministers would be more dangerous in Ireland than elsewhere, and that most of them really belonged to Scotland anyhow, he allowed them to remain.<sup>9</sup>

Despite Ormonde's change of plan a good many Ulster ministers did in fact move over to Scotland about this time, and all precautionary measures on the Scottish side failed to check them. In was not, of course, a one-way traffic; and the Irish government was no more successful than the Scottish in controlling it. The most closely hunted of the covenanters—Michael Bruce, John Crookshank, Peden, Walsh, David Houston—landed in Ireland, moved about the country, and held conventicles, with remarkably little interference from the government. Even at times of crisis, as, for example, during the Pentland rising, when the Irish government was particularly alert to the danger of infection from Scotland, its efforts accomplished very little.

The Pentland crisis was too brief to produce any scheme of combined military operations, such as was to emerge during the more prolonged crisis of the 1670s; but before that second crisis arose there was a period of relaxation. In Scotland, this can be connected with the beginning of Lauderdale's supremacy. As early as Septem-

<sup>8</sup> R. Wodrow, *Sufferings of the Church of Scotland* (ed. 1828-31), i. 108.

<sup>9</sup> Ormonde to Legge, June 25, 1663 (Hist. Mss. Comm. *Dartmouth*, i. 11); Ormonde to Bennet, June 25, July 8, August 15, 1663 (*Cal. S.P. Ire.*, 1663-5, pp. 149-50, 162, 201-2).

ber, 1667, we find Archbishop Burnet of Glasgow complaining of a change: 'We are now (it seems) resolved to overcome our rebels with patience and lenity.'<sup>10</sup> This referred to a proclamation of indemnity, which was then under consideration in the Scottish council, and which was issued in the following month. As Lauderdale's control of Scottish affairs became more complete, he moved from indemnity to toleration. The first 'letter of indulgence' was issued in June, 1669, and drew from Archbishop Burnet such a protest as caused him to be temporarily deprived of his see.<sup>11</sup>

Lauderdale's policy may be regarded as part of the general policy of toleration towards which Charles II was at this time moving; but it reflected also his own belief that the Presbyterians could be conciliated by kindness. He was, perhaps, guided by expediency rather than by principle, and his aim was not so much to heal the divisions in the church as to strengthen the power of the monarchy. He realised how important for Scotland the attitude of the Ulster Presbyterians was bound to be, and he kept himself informed of their affairs, mainly through his correspondence with Sir Arthur Forbes, marshal of the army in Ireland and afterwards earl of Granard. Forbes was of Scottish extraction and, although himself a conformist, was always ready to defend the political loyalty of the Ulster Presbyterians. The more lenient treatment that they received during these years owes something to the combined influence of Forbes and Lauderdale; and these two were the main agents in securing the first grant of the regium donum in 1672.<sup>12</sup> This was an annual payment of £600 to the Presbyterian ministers of Ulster; and though it probably was not paid very regularly, it served the twofold purpose of placing the ministers under an obligation to the crown and of making them less completely dependent on their people.

This conciliation of the Ulster Presbyterians was particularly important in view of what was happening in Scotland. The policy of indulgence, even though accompanied by Archbishop Leighton's scheme of conference and peaceful persuasion, could not satisfy the westland Whigs. They stood out for a rigid adherence to the covenant, neglected the 'indulged' ministers, and continued to resort to field conventicles. Lauderdale's zeal for moderation was, as he explained to Leighton, cooled by such 'mad pranks, so evidently threatening a rebellion,' and he now advocated a 'vigorous quelling of this spirit.' He took the view that those who refused to be satisfied by the indulgence deserved no consideration; and the attempt to suppress the Whigs by military severity was resumed.

One of the first effects of this change of policy was an exodus of extremists to Ulster. But they met with a rather dubious welcome. There were some, of course, who received them as 'suffering saints'; but the settled Presbyterian ministers of the province were content with the liberty they enjoyed of going unobtrusively about their work, and felt uneasy at the more public activity of covenanting preachers who stirred up the people by fiery sermons at great field conventicles. The covenanters, for their part, denounced the peaceable ministers for their tame submission to a prelatist government. Peden condemned Ireland (meaning the Presbyterians of the country) for 'security and formality'; and James Renwick upbraided the Irish ministers 'to their face, for their defections, indifference and lukewarmness in the cause of Christ'<sup>13</sup>

Essex, at this time Lord Lieutenant of Ireland, was shrewd enough to see that these divisions, and the absence of any noted leader, made the Ulster Presbyterians politically harmless, unless they should be goaded by severity into violent courses. So he

<sup>10</sup> Abp. Burnet to Abp. Sheldon, Sept. 23, 1667 (*Lauderdale Papers*, ii, appendix, p. 6).

<sup>11</sup> P. Hume Brown, *History of Scotland*, ii, 401-2.

<sup>12</sup> *Presbyterian Loyalty* (Belfast, 1713), pp. 383-5; R. Hamilton to Lauderdale, Nov. 5 [1672] (*Lauderdale Papers*, ii 229-30).

<sup>13</sup> For the attitude of a contemporary Ulster Presbyterian Minister to Covenanter Preachers from Scotland see Patrick Adair, *True Narrative* (ed. Killen), pp. 257-61.



followed a cautious policy; and even where the activities of the covenanting preachers led to open defiance of the law he refused to take strong measures. In the autumn of 1672 he compelled Bishop Mossom of Derry to compromise with the Presbyterian leaders there; over a year later he prevented Sir George Rawdon from taking action against an offending Presbyterian minister, who had been holding great meetings of Presbyterians in the Lisburn area; and in 1674 we find him commending Bishop Hackett of Down for his moderation towards the dissenters. It is significant that in the summer of 1674 many of the refugee ministers left the comparative safety of Ireland to return home; they must have felt that if a blow were to be struck for the covenant it would be in Scotland and not in Ulster.

At this time it certainly seemed that Scotland was on the brink of a new insurrection, more extensive and more dangerous than that of 1666. The actual outbreak was, in fact, delayed for five years; but the interval was one of prolonged crisis, rendered more acute by the fear that a successful rising in Scotland would threaten the position of the monarchy throughout the British Isles. In these circumstances, Charles called on the Irish government for military help in meeting the danger. It was a very natural move: Ireland had a considerable standing army; an Irish force could be quickly transported to the main centre of disaffection, in Galloway; the Irish government had an immediate interest in suppressing any revolutionary move among Presbyterians. Accordingly, in August, 1674, the Lord lieutenant (Arthur Capel, earl of Essex) received formal instructions to send 2000 foot and six troops of horse to the north of Ireland, to be ready for service in Scotland if required; and by October this 'northern brigade,' as it was generally called, was established near Carrickfergus.<sup>14</sup> It remained there for a year, during which the situation in Scotland, though fairly quiet, showed no fundamental change. In September, 1675, the 'brigade' was broken up; partly, perhaps, because the government's sense of urgency was less acute than it had been a year earlier, but mainly because of the practical difficulties in the way of maintaining so large a force in the same area for another winter.

The expedient of using Irish troops in this way, once hit upon, was soon repeated. In the summer of 1676, when the news from Scotland was more alarming, Essex was again instructed to concentrate forces in Ulster, and the 'northern brigade' was re-constituted and quartered for some months on the shores of Belfast Lough. A year later, in September, 1677, Lauderdale asked the king to have a similar force sent there again, and instructions to this effect were at once despatched to Ormonde, who had now succeeded Essex as lord lieutenant. Ormonde took his task very seriously. Instead of sending so many troops and companies to the north en bloc, as Essex had done, he selected a fixed number of 'commanded men' from each troop and company of the army, and was thus able to build up a force of the men best fit for active service. The command of the brigade was entrusted, as before, to Lord Granard, who seems to have shared Ormonde's determination to do the job thoroughly. 'It concerns me nearly,' he wrote to Lord Conway, 'having good men to be able to give the best account of them I can.'<sup>15</sup> To this end, he made every possible preparation for an expedition to Scotland—he laid in a store of biscuit and other provisions, he prepared field-pieces, spades, picks and shovels, and he stopped all outward-bound shipping until further order, so as to make sure of transport for his force. This time the 'brigade' remained in being from 1st November, 1677, when it held its rendezvous at Lambeg race-course, near Belfast, until March, 1678. It was broken up partly because of the heavy expense, and partly because the Scottish government's latest

<sup>14</sup> Forbes to Essex, Aug. 17, 23, 1674 (B.M. Stowe, 205, pp. 394, 409); same to same,—Oct., 1674 (B. M. Stowe, 206, pp. 127-8).

<sup>15</sup> Granard to Conway, Belfast, Nov. 3, 1677 (*Cal. S.P. Dom.*, 1677-8, p. 440).



method of dealing with the covenanters seemed to have been, at least for the time being successful.

This new method was the occupation of the disaffected shires by a large body of highland troops—the ‘Highland Host’ who would be strong enough to overawe the local inhabitants. This course was decided on in December, 1677, and put into operation early in the following year. By February 1, Lauderdale could tell Granard that there were at least 7,000 foot and 1,000 horse in the shires of Ayr, Renfrew and Lanark; and, he added, ‘this force will, I hope, do the business.’ It was said that Lauderdale hoped that the ‘Highland Host’ would goad the covenanters into open rebellion, so that he could crush them once for all. If so, this may have been the meaning behind his comment to Granard. More probably, however, all he meant was that he now had enough troops to keep order without relying on help from Ireland; and this is borne out by the fact that not long afterwards it was decided in London, presumably on advice from Scotland, that the ‘northern brigade’ should be recalled.

The depredations of the ‘Highland Host’ neither provoked an insurrection nor produced a lasting peace. The western shires were temporarily cowed; but when the highlanders had been withdrawn the covenanters resumed their activity. It is possible that they were encouraged by the growing strength of the opposition to Lauderdale, an opposition led by the duke of Hamilton, and supported not only by a group of Scottish nobles but by a considerable faction in the English parliament. For the time being, however, Lauderdale retained the king’s confidence, and continued his policy of repression in spite of all criticism. It was as a result of this repression rather than of any formed design that open insurrection broke out at the end of May, 1679. A few weeks later, the insurgents were decisively defeated at Bothwell Brig (by a combined England and Scottish force under the duke of Monmouth). Three times during the previous five years the king had ordered Irish forces to be prepared for a descent upon Scotland if rebellion should break out there; now, when rebellion actually occurred, it was from England, and not from Ireland, that military help was drawn. The reasons for the change were, at least in part, political. Monmouth, who was given command of the expedition, was, by his marriage with the heiress of Buccleuch, a Scottish duke, and it was hoped that this would make him acceptable in Scotland. Besides this, the ‘popish plot’ scare was now in full swing; and though the Irish army was in fact composed exclusively of protestants, its use in any part of Great Britain would almost certainly have been denounced as the bringing in of papists to put down the protestant religion. Towards the middle of June, when news from Scotland was still very bad, Ormonde was in fact instructed, in rather vague terms, to prepare some military aid for the Scottish government, and by that time he had already, on his own initiative, concentrated some forces in Ulster; but the insurrection was crushed so quickly that Ormonde had little more to do than look out for refugees.

From 1679 until the downfall of James VII and II this remained the principal duty of the Irish government in relation to Scottish affairs. In 1685, indeed, there was some talk of sending Irish troops to assist in suppressing Argyll’s rebellion; but that unhappy enterprise was so ill-managed that it collapsed almost of itself. When, three years later, the long-considered project of using Irish troops in Great Britain was at last carried out, they were brought not to Scotland but to England, and with disastrous results for the monarchy.

This brief survey of the military preparations in Ireland raises three questions. What system of communication was maintained between the governments in Edinburgh and Dublin? What was the position of the Ulster Presbyterians? Did Ireland in fact, contribute anything to the suppression of the westland Whigs?

From the very beginning of the restoration period it was recognised that if the

Scottish and Irish governments were to keep in touch with one another there must be some regular postal service between the two countries. In September, 1662, the Scottish council established a horse post between Edinburgh and Port Patrick, and a packet-boat service from thence to Donaghadee; and in December it was agreed that there should be a regular weekly post, by this route, between Edinburgh and Dublin.<sup>16</sup> It is not clear how well this system worked; but it cannot have lasted very long, for in 1667 the king had to recommend to the Scottish council the establishment of a postal service with Ireland, pointing out that it was necessary to the royal service that a 'way of correspondence' should be regularly maintained between the governments of the two kingdoms. The council appointed a committee to examine the question, but nothing seems to have been done at this time.

The maintenance of regular communications became more urgent in 1674, with the prospect of an Irish force being sent to Scotland. But throughout Essex's time correspondence between the governments seems to have depended on ad hoc arrangements; and for early news of what was happening in Scotland Essex had to depend mainly on reports forwarded to him by Sir George Rawdon, who lived at Lisburn in County Antrim and managed the Irish estates of his brother-in-law, Lord Conway. When Ormonde returned to the lord lieutenancy in 1677 things improved somewhat. The Scottish council re-established the horse-post between Edinburgh and Port Patrick, and a new packet-boat service with Donaghadee was started, operated this time from the Irish side. Sir George Rawdon, who managed this part of the business, was unfortunate in his choice of an agent, who turned out to be a sympathiser with the disaffected party in Scotland, and kept the conspirators informed of what was going on. But despite these arrangements, we find Ormonde complaining to Coventry, in June, 1678: 'There is a post, but no correspondence settled betwixt this place (Dublin) and Edinburgh, at least not betwixt the government there and here.'<sup>17</sup> Later on, however, he succeeded in establishing closer relations with the Scottish government, which were maintained until his recall in 1685.

The maintenance of an effective postal service was not the only difficulty in the way of satisfactory relations between the Irish and Scottish governments. There was a constitutional difficulty also. The governments of Ireland and Scotland were both, though in different ways, subject to direction from England. The English council, or one of its committees, maintained regular supervision over Irish affairs, and even comparatively minor matters were commonly referred to England for decision. Scotland was, in theory, completely free of English control and dependent solely on the king. But though the king did not make use of English constitutional machinery in dealing with Scottish affairs, as he did in dealing with Irish affairs, yet in practice the government at Edinburgh was hardly more at liberty to act on its own initiative than was the government at Dublin. The result was that Irish-Scottish co-operation depended upon direction from England, and could go no further than such direction warranted. It is significant that most of the efforts to establish, or maintain, a postal service between the two countries were undertaken at the instigation of the king or his English advisers; and even when the suggestion originated in Scotland or Ireland it was passed on, in the first place, to the authorities in London.

The effect of this constitutional position appears clearly in a proposal put forward by Essex in September, 1674, when it seemed likely that he might have to send military help to Scotland:

In regard that intelligence may be long in coming from London hither, and that the notice of any troubles, if such should happen in Scotland, must first be sent

<sup>16</sup> Register of the Privy Council of Scotland (3rd series), 1, 263; Samuel Bathurst to [Bennet], Dec. 10, 1662 (*Cal. S.P. Ire.*, 1660-62, p. 644).

<sup>17</sup> Ormonde to Coventry, June 4, 1678 (*Hist. Mss. Comm. Ormonde*, n.s. iv. 61, 66-7).



from thence to London and then orders transmitted hither I do humbly offer to his majesty's consideration, whether it may not be convenient an order be sent hither directing me that upon certain intelligence of any commotions in Scotland (for I have appointed Sir Arthur Forbes to send over two or three men, and maintain them there on purpose to give us true and early accounts of affairs) I should forthwith appoint these men to embark: as also that a commission may be ready on the other side to meet Sir Arthur Forbes upon his landing there.<sup>18</sup>

There is no indication that Essex received the order he asked for, and in any case the danger that the Irish force had been prepared to meet did not arise. But in 1667, when a similar force was assembled on the Ulster coast, the same question was raised again, not only by Granard, who commanded the 'northern brigade,' but by Lauderdale also. In November he wrote to Danby:

Now my humble desire is that the king would send immediate orders into Ireland, that my Lord Granard may come over into Scotland upon the first call from the king's privy council in Scotland . . . You may assure his majesty we shall not call for that party out of Ireland if we find we can probably do his business without them, but if what we propose here in this kingdom should not answer our expectation, it will be too late to send for orders, and therefore I hope the king will trust us here to send such order to Ireland.<sup>19</sup>

Lauderdale's proposal was at once accepted, and orders to this effect were sent to Ormonde. The forces prepared at the same time in the north of England were similarly placed at the disposal of the Scottish council. The necessity for making such special arrangements as those of 1674 and 1677 shows very clearly that however willing the Scottish and Irish government might be to co-operate in face of a common danger they could not carry that co-operation very far without explicit authority from England. At the level of government, Irish-Scottish relations appear simply as a branch of English policy.

It would be misleading, however, to consider the Irish government as being, at least in this matter, a mere tool of the English council. It had a direct interest of its own in the suppression of the westland Whigs, whose activities were potentially a danger to the peace of Ulster. Opinions about the extent of this danger varied. In the summer of 1676, at the very time when he was preparing troops for service in Scotland, Essex was less alarmed about affairs there than about reports that the covenant was being taken in County Londonderry. This alarm continued into the following year, when covenanting preachers were not only active in Ulster but had penetrated into Northern Connaught.<sup>20</sup> Reports from Archbishop Boyle and Sir George Rawdon show that these preachers had a popular following, and express fears of what might happen in Ulster if there were any upheaval in Scotland. Ormonde apparently shared these fears. When he heard of the defeat of the Covenanters at Bothwell Brig he wrote to Sir Robert Southwell, 'It was time to send us good news out of Scotland; the brethren in all parts of this kingdom, especially in the north, were growing very bold, and ready to come in to bear a part, if those of Scotland had had success'<sup>21</sup> And a few weeks later he wrote to Lord Burlington, 'I was not without some apprehensions of the common sort of Scots in the north, being well assured that their false teachers held correspondence with their brethren in Scotland.' But when charged with slandering the loyalty of Irish protestants in general Ormonde modified his expressions considerably, and confined his accusations to 'some very few inconsiderable persons of the non-conformists.'

<sup>18</sup> Essex to Danby, Sept. 12, 1674 (B. M. Stowe, 214, ff. 276-8).

<sup>19</sup> Lauderdale to Danby, Nov. 8, 1677 (*Lauderdale Papers*, iii. 89-90).

<sup>20</sup> Bp. Otway of Killala to Essex, Jan. 22, 1676-7 (*Essex Papers*, ii. 94-5).

<sup>21</sup> Ormonde to Sir Robert Southwell, June 23, 1679 (Hist. Mss. Comm., *Ormonde*, O.S. ii. 288).



Against these varied expressions of distrust may be set the opinion of Lord Granard, who probably knew the Ulster Presbyterians better than any other important official of government. In March, 1678, he sent Ormonde a declaration of loyalty signed by the leading Presbyterian ministers in Ulster. In 1679 copies of this, or of a similar declaration, were being circulated; and in the summer of 1680 four Ulster ministers, at the instigation of Sir Hans Hamilton, of County Armagh, signed a letter against taking up arms against the crown, and this was presented to the king by Lord Granard. These declarations certainly reflected the opinion of the bulk of the settled Presbyterian ministers of Ulster, but they were naturally distasteful to the covenanters. Patrick Walker's garbled account of the signing of the declarations illustrates the attitude of the refugees from Scotland towards the tamer policy of the Ulster Scots, and is also, incidentally, a fair example of the kind of story that won for Peden the title of prophet':

In that short time he was in Ireland, the government required all Presbyterian ministers in Ireland, that they should give it under their hand, that they had no accession to the late rebellion at Bothwell Bridge in Scotland, and that they did not approve of it; which the most part did, and sent Mr. Thomas Gowans, a Scotsman, and one Mr. Paton from the north of Ireland, to Dublin, to present it to the Lord Lieutenant; the which when Mr. Peden heard, he said, Mr. Gowans and his brother Paton are sent and gone the Devil's errand, but God shall arrest them by the gate; accordingly, Mr. Gowans by the way was struck by a sore sickness, and Mr. Paton fell from his horse and broke or crushed his leg.

The truth is, that the Ulster Presbyterians as a body were too comfortable to rebel. Their quiescence was a tribute to the success of the moderate policy followed by the Irish government; and this moderation, though in one way it may have complicated things for the Scottish council by leaving Ulster as a haven of refuge for persecuted covenanters, was probably on balance a contribution to the peace of Scotland. It is not unreasonable to suppose that had there been another Galloway in the north-east of Ireland the likelihood of an explosion would have been greatly increased.

Any attempt to assess the value of the military preparations of the Irish government must be equally speculative, for no Irish troops were in fact sent to Scotland. It is hardly likely, however, that the 'northern brigade' of 1674-5 would have been re-constituted in 1676 and again in 1677 unless its presence in Ulster had had a good effect in Scotland. Lauderdale's opinion, in December, 1677, was 'it hath been of great use to the king's service that the party is so near, and hath damped the disaffected, and I beg they may continue on that coast'. It may perhaps be not without significance that the covenanters began their insurrection at a time when there was no Irish force ready to move across the channel at a moment's notice.

The union of the three kingdoms in 1603 had marked a change in the character of Irish-Scottish relations; so did the revolution of 1688-90. In the post-revolution era social and economic links between Ireland and Scotland continued, and in some respects grew stronger; but they ceased to have the urgent political significance that had formerly attached to them. No doubt various partial and subsidiary explanations of this change can be put forward, but the fundamental reason lies in the ecclesiastical position. The Ulster Presbyterians, though profoundly dissatisfied with their treatment, were convinced that they must stand by the Revolution settlement. The Scottish danger now came not from the remnant of covenanters but from the Jacobite highlanders, whom no party in Ireland was willing, or if willing able, to help. The events of 1715-16 showed the true character of the situation. The Irish Roman Catholics, though strong in numbers and Jacobite in sympathy, were too cowed to act; the Ulster Presbyterians defied the sacramental test, imposed on them in 1704, and flocked into the militia to defend the Protestant succession. In this essential point the Scots of Ireland were at one both with their brethren in Scotland and with the ruling class in Ireland—they had ceased to represent an independent political interest.

10th March, 1964.

## THE COPELAND BIRD OBSERVATORY

T. K. EDWARDS

I have been asked to talk to you about the Copeland Bird Observatory, but before I speak about it in detail perhaps I should outline very briefly the background against which it stands.

Before the 18th century man's interest in birds was almost entirely in their value as food, with a certain amount of sport and superstition which had survived from forgotten pagan rites and beliefs.

Shrewd observers have of course been abroad since earliest times, but in the 18th century began that acceleration in the growth of human populations which made the industrial revolution and the start of the technical sciences. This growth is now an eruption, and while it may bring appalling consequences on our not too distant descendants, it has given to us in our generation a degree of widespread wealth and leisure, one facet of which has been the development of ornithology as an amateur science.

Man being what he is, one of the first fruits of the industrial revolution was a reasonably cheap and reliable gun, and in the 19th century this was the tool of the ornithologist. Its product was a series of collections of birds, many of which exist to-day. They were, and still are, of great importance.

As the 19th century drew to a close, the field glass, the camera and perhaps most important of all, bird books with accurate colour plates came on the market. Crude and clumsy as these early instruments were, the bird in its natural surroundings became a practical study. To-day the illustrated bird book is the corner stone of ornithology and the binocular the practical tool.

Thus the 20th century saw the start of behavioural studies of birds, and as the numbers of amateur ornithologists grew, there was no limit to the fascinating problems to which they might turn their attention.

One of the most fascinating pieces of bird behaviour is migration and by the close of the 19th century a number of workers were beginning to try and unravel its problems.

Migration has of course been known to exist for many years—you can find Biblical references to it. Yet even in the 18th century it was widely believed that when birds disappeared they were hibernating like squirrels.

The realisation that the disappearance of a bird population could be linked with the emergence of a similar population, often many hundreds of miles away, gave rise to many questions, to solve which ringing was introduced in the closing years of the last century.

Ringling involves catching a bird, marking it with a small metal ring on the leg and releasing it. The ring of course bears a serial number and a request to notify the ringing authority. Obviously a very large number of birds have to be ringed to produce reasonable results. Hence the ringing has to be done somewhere where large numbers of birds are to be found, and further, the work of more than one person is required. Here was the genesis of the bird observatory.

The first observatories were at Rositten on the German Baltic coast and on Heligoland. At these places, the huge autumnal exodus of Scandinavian birds could scarcely be overlooked, and these observatories were well established by 1914.

It was not until about 1930 that the first British observatories were founded, at Skokholm off the Pembroke coast and on the Isle of May in the Forth. The first world war and the ensuing economic chaos with perhaps some resistance to Germanic



ideas were possibly responsible for the delay. They were barely into their stride before the second world war was upon them. Thus tragically does a third of the 20th century pass. When the war ended, bird observatories began to open rapidly and before long there was a regular chain of them strung out between the Shetlands and the Scillies.

Migrating birds were believed to follow fairly closely defined routes skirting the coastline, and in the old collecting days certain places were found to be more productive of rarities than were to be had even a few miles away. These were often headlands and islands projecting into the coastal 'flyways' as they have been called. While we now know that major bird movements are not confined to these coastal channels, offshore islands have proved ideal sites for bird observatories.

The Copeland Bird Observatory was founded by Arnold Bennington in 1953. At that time Arnold Bennington was giving classes on ornithology in connection with the W.E.A., and a visit to the Copelands was undertaken as part of this. The idea of founding a bird observatory was suggested, and under Arnold Bennington's guidance plans were laid and the observatory began to function in earnest in 1954.

Every Ulsterman knows where the Copeland Islands are, and it is of the middle island, middle in size and location of which we are speaking.

It lies about half a mile north of the Great Copeland and is divided from the third and smallest island, Mew Island, by a channel about 50 yards wide. On older maps you will find our island called Lighthouse Island although the modern lighthouse stands on Mew Island. Because of this apparent Irishism we use a local name, John's Island. John's Island, is I believe a reference to a former owner or tenant and indeed the names of small islands often change in accordance with the changing interests of the owners or occupier. Recently we have been hearing "Bird Island" mentioned by local boatmen, a reference to our own activities. To-day the islands are part of Captain Ker's estate and to him we owe a great debt for his continued interest in our affairs.

John's Island is roughly circular and is steeper on its seaward side than on the mainland side. Its rocky boundaries give way to grass and the typical shore vegetation which still pays some respect to the former cultivation of the place. On top of the highest part of the island is a group of low buildings in which the Observatory is housed. These are the old lighthouse buildings and parts of them are very old. I believe that the first light, a brazier, was shown about 1714 and part of this ancient tower is still clearly visible. At a later period more adequate buildings were put up and the light housed in a circular tower, the substantial remains of which are the most obvious feature of the buildings. The present lighthouse on Mew Island was built about 1884. Although in the 18th century Belfast was a relatively small town there was of course a large coasting trade in the absence of adequate roads carried on by small vessels. In those days when no powerful electric lights traced the shore line, the approach to Belfast Lough from the South in rain or mist must have been a tricky business with Mew Island jutting out half a mile from the brazier, a feeble thing compared with even a modern street lamp. On wet misty nights with poor visibility and little wind the tides round the Copelands must have made them a hazard of which the modern sailor has no conception.

When the first visits were made by members of the new Bird Observatory all but one of the buildings stood roofless, their interiors a heap of rubble. The lighthouse had been abandoned 60 years and more. The last farming tenants had gone well before the war and save for a Radar screen erected during those perilous years, the island had been visited only by holiday makers on a day's outing from Donaghadee and occasional Scout troops for their annual camp. From 1954 the island has been visited regularly and slowly the buildings have been refurbished to suit our needs, until now dining-room, laboratory, common room and mens' and ladies' dormitories



have been erected. Devoid of luxury they are very adequate for their purpose, and in the eyes of those of our members whose toil and effort have brought them into being rank as buildings which few Bird Observatories can better.

The decision to use the Copeland Islands as the site of a Bird Observatory was largely fortuitous. There was no warrant for believing that it would be a success. Indeed, quite the contrary, there were those who considered that it must inevitably be a failure as there was no evidence that migration could be seen and studied there to any appreciable extent. The success of a Bird Observatory depends not only on the birds but also on the observers, and had an attempt been made to start a North of Ireland Observatory at some other place which might have seemed geographically more attractive the attempt would almost certainly have failed, for the simple reason that such places are too difficult to reach from Belfast. Our Observatory is manned on something like 100 days each year between the beginning of March and the end of October. We would like to increase this considerably but it is not a record to be ashamed of and stands favourable comparison with many of our contemporaries.

As the Observatory movement gathered momentum after the war they began to spring up all round the coast. Some were the private enterprise of individuals, others were offshoots of natural history societies. Ours is almost an exception in being run as a self-supporting society. With such diverse backgrounds, it was only natural that different ideas and different standards were to be found in each. So that the maximum value could be derived from the various observations the British Trust for Ornithology initiated the Bird Observatories Conference, and each year representatives of the various Observatories meet in conference at Oxford. Apart from the obvious advantages of the inter-change of ideas, it has given the movement a degree of cohesion which is most important. This is manifested by a standardization of the forms and logs in which migration records are made. A digest of these reports is published by the B.T.O. and is prepared by the Trust's Migration Research Officer. Until a few months ago this was Kenneth Williamson, and there is no doubt that the study of bird migration has benefited more at his hands, aided by the co-operate observations of the observatories, than from any other single source apart from ringing.

Bird observatories welcome anyone who has an interest in birds and indeed they welcome those who have no particular interest beyond a lively curiosity. When it is operating, a bird observatory is in charge of a ringer. A ringer has to be licenced by the British Trust for Ornithology in order to obtain a supply of rings or to be able to ring at a bird observatory. The licences are only issued to those who have satisfied the Trust's Bird Ringing Committee that they have the necessary qualifications to undertake this work both accurately and sympathetically. The Trust is very jealous of its high standards and the licences are not issued lightly.

To those who have never actually attempted the feat, the capture, unharmed, of a wild bird may appear to be a considerable undertaking. We use two types of trap principally. The first is the Heligoland type, bearing the name of the famous observatory where it was developed. It is essentially a large funnel of wire netting. They vary in size, of course, but those we use on the Copelands are about 30 feet wide at the mouth and about 20 yards long. The height is about 12 feet at the entrance tapering to about 6 feet. At the narrow end is a wooden box with a glass window. Birds are driven in from the wide end and as they realise their predicament they fly to the glass window as an apparent means of escape, when a trap door is closed behind them.

About 7 years ago mist nets began to be used in this country. From 20 to 60 feet long and about 6 feet high, these nets are made of very fine cord and against a broken background are almost invisible. Their great advantages are relative cheapness and portability. However, they are not so effective in windy weather and a degree

of practice is needed in extricating birds safely. Ringers who wish to use mist nets now have to have their ringing licences endorsed with permission to use them.

We also use a number of other types of trap, most of them designed for specialised situations, but 90 per cent. of the birds which we catch are caught in the Heligoland traps or mist nets.

Apart from trapping birds we also ring young birds in the nest. This calls for a considerable degree of care and as a method of ringing has the great advantage that you do know precisely the breeding ground of the birds which you are handling whereas many of the passage birds which visit us come from, and are going to, places which will only be revealed by the recovery of one or more of them.

Dazzling birds at night with torches is another method of catching which we use, and as I shall relate we use this method particularly for Manx Shearwaters.

Day at the observatory starts at first light. Usually there is a sense of excitement speculating on the birds which may have arrived during the night and as soon as it is light a round of the Heligoland traps is made. Depending upon the weather mist nets are erected at places which we know from experience are likely to produce results. After several hours breakfast provides a welcome respite, but a brief one if birds are about. By lunch time there is usually a lull in bird activity and another break for the trappers. During the morning we will probably have walked round the island to see what is about and these excursions will give some idea of the numbers of birds present. Often we will note birds which we have little chance of catching, for example auks and perhaps sea-ducks.

The noon-time lull usually gives way to a period of activity later in the afternoon as birds start feeding before going to roost, or perhaps to continue their journey, for many of our smaller birds migrate at night and one of the most fascinating pieces of ornithological research in recent years has revealed that they can and do navigate by the stars.

Evening does not see the end of our activity for as darkness falls in the spring the Manx Shearwaters will begin coming in to their nests in the sandy burrows on the island, particularly if it is a misty or dark night. We catch these birds by dazzling them with a torch and later in the year we will pass our evenings in a similar way with water rails. Thus it will be seen that life at a bird observatory not only provides interest literally from dawn to dusk but a considerable amount of physical exercise as well. When we have finally abandoned catching birds for the day the records have to be written up and this is of course one of the most important features of our activities.

Not all days will produce birds in quality or variety and this of course is common to all observatories. If things are slack ornithologically, there is still plenty to be done in looking after our property, a task which is a little like the Forth Bridge for when we seem to have come within sight of the end of one project we also bring into view the beginning of another.

One of the first discoveries made by regularly manned observatories was that quite a large number of birds hitherto thought to be so rare that their occurrences could be conveniently listed in the text books in fact occurred fairly regularly each year, even if in very small numbers. The value of the B.T.O.'s central organisation is illustrated here, for when a very rare bird occurs it will often be found that other observatories have recorded it as well. When we had the pleasure of catching an Icterine Warbler in 1958 there was at that time almost an invasion of them with some 16 records in Great Britain, ours being the most westerly. The occurrence of these rare birds had been an important factor in the development of observatories in general, for every ornithologist likes to have the chance of seeing these unusual visitors.

Sometimes, particularly on the East Coast of England, observatories record what we term "Falls" when relatively huge numbers of birds of one or two species occur,



arriving perhaps in the space of a few hours and often tired and exhausted. Naturally many workers tried to analyse these falls to find a reason for them. Usually when large numbers of birds are concerned a very small percentage of them will be rarities.

It was found, though not invariably, that a period of anti-cyclonic weather preceded the falls which were thought to be precipitated by the approach of adverse weather. With the observations of the various observatories Kenneth Williamson plotted the arrivals of birds against maps showing the weather systems immediately before the falls occurred and evolved his theory of down-wind directed drift. This theory postulates briefly that when emigrant birds lose their bearings in bad weather over the sea they come down to sea level and assess the direction of the wind from the waves and then fly down wind. This will usually bring them or a large part of them to the British coast. Williamson suggested that this had a survival value for the species concerned and that the rarities among these falls might be taken as markers for the area of origin of the birds concerned, for many of these very rare British birds have but a local distribution in Europe.

This theory has been one of the most important developments arising from observatory work, and it is a foundation of any understanding of bird movements. The theory has been attacked though never overwhelmed, and if in the 1950's observatory workers relied on it too much, it was only because no other reasonably tenable theory existed which offered an explanation for their observations. To-day we cannot accept that the arrivals of these rarities can be explained solely in this fashion. It has been demonstrated that over-shooting when some individuals proceed far beyond their normal range and reverse migration when some birds, usually young ones, start their migration by flying many miles in the opposite direction to that which they should take, occur regularly. Again the collation of an observation here and another there at the observatories have played their part in describing these phenomena and discovering these fascinating problems.

We do not often get very large falls at the Copelands, nor do we get very large numbers of rare birds compared with some of the other observatories such as Fair Isle or Cape Clear. The reason why we do not get the large falls is probably because there is so much land in every direction that any substantial numbers of birds caught by adverse weather conditions in the Irish Sea can readily disperse overland before they become tired and exhausted and disorientated.

If we do not get much in the way of large falls we do get plenty of evidence of migration, but of course you can never say with much certainty that a given bird is in fact a migrant. One morning when you go out you will find a few birds unringed which you know were not there the day before. They will have arrived unnoticed during the night and after a day or so will depart again. Frequently we see migration occurring over the sea when flocks of birds one after the other are to be seen passing. The pattern is of course very different with different species and we get plenty of evidence of drift migration, over-shooting and reverse migration. We ringed a Swallow in 1962 which eleven days later was found in East Germany, and it seems obvious that this bird had become displaced far to the west of its normal spring migration route. We believe that the majority of semi-rare birds which we get, such as Whinchats, Tree Pipits, Garden Warblers, fall into this category, and examples of over-shooting and reverse migration are to be found in our records.

Another interesting discovery made very largely by the bird observatories from the material garnered on this problem of drift has been the realisation that American birds can cross the Atlantic. From time to time American birds have been obtained in the British Isles, but until quite recently, perhaps ten years ago, it was widely believed that they must have escaped from aviaries, or at best been carried over on ships. However as records began to be amassed it appeared that cage bird fanciers



became extraordinarily careless in autumn and to a somewhat lesser extent in the spring. Analysis of the weather patterns over the Atlantic before these occurrences showed that a passage assisted by the wind was in fact possible. Also numbers of American birds have been recorded which are unknown in aviaries because of their uninteresting plumages. It is now accepted that American birds do fly the Atlantic and indeed some of ours go to America. Of course ship-assisted passages occur as well, perhaps more than we realise, but the point is that these American birds get here without deliberate assistance.

On the Copelands we have identified the American Fox Sparrow, a specimen of which was caught in 1961. This record was the first occurrence in the British Isles, although Fox Sparrows have been obtained once or twice elsewhere in Europe. Hence we have had the privilege of adding a new species to the British list. Whether it is right to describe as a "British Bird" a species of which only one example has been proved is a point on which ornithologists disagree, but if one proved occurrence is not going to be the datum, it is very difficult to know at what arbitrary point the establishment of a "British" bird should be made.

Recently we have caught a second American bird, a Scarlet Tanager. If this record is officially accepted as valid it will make a second bird which we have added to the British list. Although many of our contemporaries from their geographical positions get far more in the way of rarities than we do, it is by no means all of them that have added two new birds to the British list!

Altogether we have ringed over 16,000 birds. Most of these have been the commoner birds which are so important to us. Some are not so common. As I said earlier, ringing is primarily a means of studying migration and at the risk of repeating myself I must emphasise that the work done at the Copeland Observatory should not be looked at by itself, but in the context of the widespread ringing of British birds.

Our recoveries are nevertheless not without interest in their own right. A Goldcrest ringed on the 23rd April, 1958, was recovered on the 23rd November the following year at Aldermaston in Berkshire. This is in fact the record as far as distance goes for a British ringed Goldcrest and of course recoveries from these tiny birds are few and far between. Recovery of a Raven from near Campbeltown in Argyll was a satisfying event, but unfortunately the Ravens no longer nest on the Great Copeland Island where this particular bird was ringed in 1956.

Warblers yield very small returns, but we have had two Chiffchaffs recovered from the Biscay coast of France and the South of Spain respectively.

We do not get many waders at the Copelands as we have not got a sandy or muddy beach which would attract this type of bird to any extent. Nevertheless an Oyster-catcher ringed on the island where we usually have one or two nests each year was recovered in Portugal and it is only quite recently that we have realised that this largely sedentary bird does in fact perform on occasions quite substantial movements. From the mere handful of Dunlin which we have ringed we have been lucky enough to obtain one good recovery from Morocco.

Naturally the commoner birds, or at any rate the birds which we get in larger numbers and of which we ring larger numbers, yield better recoveries. Our Song Thrushes appear to pass through the island to winter quarters in Ireland from breeding grounds in the North of Scotland and North Eastern England, and the same applies with our Blackbirds. There is a movement of Blackbirds from the Continent into Great Britain in the autumn, and this is evidenced by a recovery of one of our birds from Heligoland. Herring Gulls which we have ringed in quite large numbers as young or pullus birds, since we have a substantial breeding colony on the island, have yielded a wide scattering of recoveries round the North East coast of Ireland and from the adjacent Scottish coast. This bird, like the Oyster-catcher, is largely

sedentary and the young birds apparently do not wander very far from their natal colony to which they will eventually return when they reach maturity. Like the Oyster-catcher, a proportion of them apparently do migrate for we have had a recovery from Holland of a two-year-old bird. In contrast to the Herring Gull, its close relative, the Lesser Black-backed Gull is migratory and recoveries of this bird indicate their passage down the Irish Sea to their winter quarters off the Spanish coast.

I have previously mentioned the Manx Shearwater which breeds on the Cope-lands where there is a colony of perhaps 200 pairs. This is an extremely interesting bird. It is a true sea bird in every sense of the word and it literally only needs the land to support its egg and keep it out of the water. When breeding is finished, they disappear into the Atlantic Ocean and many of them probably never sight land until the following spring when they return to British waters. The bird does not breed on the Calf of Man where it formerly bred in very large numbers, and the famous Belfast naturalist, William Thompson, has related how this extensive colony was wiped out in the early 1800's by the sale of young birds at 9d. a dozen. Thompson relates that as much as £30 a year, a sizable sum in those days, was made from this traffic, and this would mean 9,600 young birds per year. The main breeding colony to-day is on Skokholm off the Welsh coast but there are other colonies in the Scilly Isles and also in the Hebrides, as there are on Rathlin Island. On a spring evening we see these birds gathering in rafts off the island. After dark, particularly on a misty or dark night, they come ashore. The first visits to the nesting burrows will be made towards the end of February and from then onwards activity increases. How these birds which have not got particularly good eyesight can hurl themselves quite literally in the pitch darkness on to the island in the close proximity of their nesting burrow is something of a mystery, and their curious cackling calls as they go about their courtship in the pitch darkness is rather weird and strangely beautiful. R. M. Lockley who began to study these birds in the 1930's has related in his excellent book "Shearwaters" his early experiments in ringing, and his amazement at discovering that birds leave their nests to go and feed as far away as the Bay of Biscay, returning a few days later to relieve the sitting bird. Their powers of flight and orientation are truly amazing and among other experiments he sent a number of birds to Boston in the U.S.A. which returned in an astonishingly short time to their nests on Skokholm. From the recoveries which we have had it would appear that the bulk of our birds feed no further away than the waters round the North of the Isle of Man and indeed anybody who has made a daylight passage across the North Channel may well have encountered parties of these birds which will probably include quite a proportion of immature non-breeding youngsters. We have had a May recovery in Co. Wexford which might have been a bird proceeding to the Southern feeding grounds which the Skokholm birds seem to prefer, and I do not think that the majority of the Skokholm birds visit the Northern part of the Irish Sea from what I recall of the recoveries which the Skokholm colony has revealed. Our most interesting recovery undoubtedly was one from the coast of Brazil in December indicating the vast distances which this bird covers in the course of a year. There is some interchange between the various colonies of Shearwaters, and we have recovered about half a dozen birds which had originally been ringed on Skokholm and one of our birds has been found breeding on that island.

We have also had some interesting recoveries from terns which we have ringed in quite large numbers. Unfortunately the tern colony on Mew Island has collapsed, only a handful now nesting compared with the multitude of 20 years ago. When Kenneth Williamson visited the island in 1942 he estimated that some 15,000 terns were breeding. Last summer only about 200 nests of all species were present. We blame the Herring Gulls for the decrease for Williamson only recorded a modest colony



of these gulls. William Thompson, oddly, had a similar experience in his day. In 1827 he tells us that the colony was thriving, yet a few years later it was sadly reduced, almost certainly because of human depredation. The colony appears to have remained at a low level until it began to build up to the peak figures of 1942. Terns are notorious for their ups and downs, and really we know very little about their ecology. Incidentally, a glimpse of the changes in standards is given by Thompson when he describes Mew as being "covered by short grass affording pasture to cattle." If you put cattle on Mew to-day you would probably be prosecuted for cruelty!

While we have ringed many terns on Mew, our main activities have been on Burial Island near Ballyhalbert, and also Green Island in Carlingford. Common and Arctic terns are the most frequent tern species on our coast, but only recently have we been able to tell the nestlings apart, and of course you cannot very well ring them unless you know which is which. The Sandwich tern, of course, has figured largely in our totals, as has the rare Roseate tern. We are very fortunate in Northern Ireland in having several colonies of this bird, and indeed we have ringed a very substantial fraction of the total of British ringed Roseates.

Our recoveries of these birds are from the Ghana region of Africa where they winter, and indeed they spend their first summer in that region.

In 1957 a visit was made to the famous Gannetry of Ailsa Craig and about 1000 birds were ringed by us. Again in 1963 a similar expedition was undertaken, this time at the request of the British Trust for Ornithology, and again about 1000 birds were handled.

Recoveries of these birds are very interesting. They are yielding about 5 per cent. recoveries, a relatively high figure. These recoveries clearly show the shift of the population between summer and winter quarters. They show too that the young birds tend to push further south in the autumn than the adults. Our most southerly recovery is off St. Louis in Senegal, just on 3,000 miles from Ailsa. This was a first winter bird but in subsequent winters they do not seem to venture far beyond the straits of Gibraltar. The bulk of our birds are recovered from the Biscay area and the Atlantic coast of Iberia. Gannets do not start breeding until about 4 years old, and an interesting feature of the summer recoveries is the way that they suggest that the Ailsa Gannets work down the Irish Sea from Ailsa to feed for we have no summer recoveries from Northern Ireland or the Hebrides. The substantial number of Gannets to be seen in those waters in summer may well come from St. Kilda, where there is a large colony, or from some of the other Hebridean colonies.

Another of our activities has been the concentrated ringing of Swallows around Greyabbey in Co. Down. We have ringed well over 1400 birds, and without a recovery! We are of course getting a good deal of information, and many local recoveries of birds we have ringed in previous years, and this work is being added to research into Swallows which is currently going on in Great Britain.

Apart from birds, one or two of our members have made an extensive botanical list. I am no botanist, but I imagine that our island must be one of the most thoroughly surveyed from this aspect on the Irish coast.

As for mammals, only the rabbit is found, and despite several outbreaks of myxomatosis the colony survives, and indeed is now flourishing.

You will see that we keep ourselves occupied throughout the year. What have we achieved in our ten years of activity? We have built upon Arnold Bennington's well-laid foundations a flourishing bird observatory which will stand comparison with any of our contemporaries. The work which we have done has helped to swell our overall knowledge. If our records appear to be mediocre compared with some other observatories this is no fault of the observers. In compensation, we can offer the naturalist from Belfast, life on an island at very little cost in time and money. This has resulted



in regular visits by young people, some of whom have qualified as ringers, and in as much as training of any sort improves the individual, these young people must be more responsible citizens on that account.

For the future, we have yet much to learn of bird movements. A few years ago one of Europe's leading authorities said that our knowledge of bird migration, profound though it was in some particulars, amounted to no more than sign posts in a largely virgin forest.

As man continues to put more and more of the countryside to his own use, so the pressure on our fauna increases. Added to this is the awful threat of toxic chemicals used in agriculture, a threat perhaps to man himself.

A properly constituted Nature Conservancy is needed to husband our country, to cultivate marginal areas of land so that they may support as many species, not only of birds, as they can, and to strike a balance between the conflicting interests of farmer, sportsman, naturalist and the ever-increasing number of people who simply enjoy the countryside.

Ornithological research is increasingly turning to this problem of conservation, and the bird observatories will play an important part in it. No intelligent policy of conservation can be formed without knowing a good deal about the mortality of the species concerned. Where birds are concerned ringing is one of the best methods of finding this out. The observatories too may tell from their records whether any species are shrinking or expanding, and in an era when conservation is becoming increasingly necessary this alone is a complete justification for our existence. In ornithology, as in so much else, it is the regular effort at one place which in the end yields results, rather than sporadic forays to more distant and apparently greener fields.

It is worth it? I believe that it is. A countryside with a wholesome fauna must be a better place in which to live. Once lost these things can never be recreated, and because we can see no economic use for so many of the species which inhabit this earth with us is no reason to suppose that another more crowded generation may not find some of them of value. For this reason alone we have no right to destroy them by neglect, and in doing so perhaps destroy our own ecology.

These are indeed profound matters for a small society to concern itself with, but I hope I have shown you that our contribution if small is none the less significant in a field where much has been discovered, and where much more has yet to be found. As a hobby, ornithology has much to commend it, and when the interest is harnessed to an organised field of research, there is a worthwhile dimension added.

Our reward is the hope that a more complete knowledge may help to ensure that our children and those who follow them will have these same fragile and beautiful creatures to enjoy, and to use, if they need them.

I am indebted to the members of the Copeland Bird Observatory whose work has provided the material for this lecture, and in particular to Mr. J. G. Gray, whose advice in its preparation has been invaluable.



**BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY**

**LECTURE PROGRAMME FOR THE 1961-62 SESSION**

14th November, 1961—"FILMING ULSTER'S WILD LIFE."

Mr. CHAS. DEANE, F.M.A.

12th December, 1961—"VIKING EXPANSION IN ICELAND AND GREENLAND."

Mr. J. G. CRUIKSHANK, B.Sc.

9th January, 1962—"GARDEN PESTS—WITH SPECIAL REFERENCE TO NORTHERN IRELAND."

Mr. R. J. WILLIS, B.Sc.

13th February, 1962—"BIRDS OF THE ULSTER COUNTRYSIDE WITH VIEWS OF IRELAND."

Mr. HERBERT BELL.

13th March, 1962—"DESIGN AND THE IRISH LINEN INDUSTRY."

Mr. RONALD H. CRAWFORD.

**BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY**

**LECTURE PROGRAMME FOR THE 1962-63 SESSION**

13th November, 1962—"THE FACE OF GREECE."

Dr. R. W. M. STRAIN, B.Sc., F.R.C.P.(I.).

11th December, 1962—"A VISIT TO THE FAROE ISLANDS."

Dr. W. R. M. MORTON.

8th January, 1963—"AN ORNITHOLOGICAL EXPEDITION TO ICELAND."

Mr. ARNOLD BENNINGTON, M.A.

12th February, 1963—"RISE AND DECLINE OF THE IRON ORE AND BAUXITE INDUSTRY OF CO. ANTRIM."

Mr. HAROLD E. WILSON, M.Sc.

12th March, 1963—"BUTTERFLIES IN THEIR HABITATS."

Mr. R. EAGLESON.

2nd April, 1963—"THOMAS LEDLIE BIRCH, UNITED IRISHMAN."

Mr. AIKEN McCLELLAND.

2nd May, 1963—LARMOR-ALLWORTHY MEMORIAL LECTURE. "D'ARCY THOMPSON AND THE PROBLEM OF FORM."

Professor P. B. MEDAWAR, C.B.E., M.A., D.Sc., F.R.S.



**BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY**

**LECTURE PROGRAMME FOR THE 1963-64 SESSION**

12th November, 1963—"WITH THE NATIONAL TRUST FOR SCOTLAND TO  
THE WESTERN ISLES."

Dr. R. W. M. STRAIN, B.Sc., M.D., Ph.D., F.R.C.P.(I).

10th December, 1963—"THE DEVELOPMENT OF BELFAST HARBOUR."

Mr. F. W. P. HAMPTON, B.Com.Sc.

14th January, 1964—"SEASHORE LIFE AND PATTERN."

Mr. R. W. CARLISLE.

11th February, 1964—"IRISH-SCOTTISH RELATIONS IN THE 17th CENTURY."

Professor J. C. BECKETT, M.A., M.R.I.A.

10th March, 1964—"THE COPELAND BIRD OBSERVATORY."

Mr. T. K. EDWARDS.

## LIST OF MEMBERS

## A

B. J. AHERN, 735 Antrim Road, Belfast, 15.  
 FRANCIS ALEXANDER, B.E.  
 W. N. ALLEN, M.B.E., 78 Balmoral Avenue, Belfast, 9.  
 HUGH ANDERSON, 20 Massey Park, Belfast, 4.  
 THE EARL OF ANTRIM, Glenarm Castle, Co. Antrim.  
 W. J. ARTHURS, Fermanagh House, Belfast 1.  
 MISS EILEEN AYRTON, R.U.A., 8 Mount Pleasant, Belfast, 9.

## B

MRS. N. S. BEATH, Elmwood, University Terrace, Belfast, 7.  
 PROF. J. C. BECKETT, 19 Wellington Park Terrace, Belfast, 9.  
 BELFAST BANKING CO., LTD., Waring Street, Belfast, 1.  
 J. P. BIRCH, 12 Malone Park, Belfast, 9.  
 LT.-COL. BLAKISTON-HOUSTON, Roddens. Ballywalter, Co. Down.  
 VERY REVD. R. S. BREENE, LL.D., 2 Mount Pleasant, Belfast, 9.  
 THOMAS BROWN, 11 Lombard Street, Belfast, 1.  
 HENRY BURROWES, Ulster Bank, Ltd., Waring Street. Belfast, 1.

## C

WILFRED M. CAPPER, B.COM.SC., West Winds, Craigavad, Co. Down.  
 R. W. CARLISLE, 28 Hillside Drive, Belfast, 9.  
 JAMES CARSON, 79 Donegall Park Avenue, Belfast, 15.  
 GILBERT J. CHAPMAN, J.P., 428 Oldpark Road, Belfast, 14.  
 MRS. COLE, Ardmara, Greenisland, Co. Antrim.  
 W. COULTER, Ballygally Youth Hostel, Co. Antrim.  
 H. COWAN, 40 Balmoral Avenue, Belfast, 9.  
 MRS. EMMA CRAWFORD, Islandderry House, Dromore.  
 R. H. CRAWFORD, 7 Fountain Street, Belfast, 1.  
 MISS U. CREIGHTON, 18 Rossmore Avenue, Belfast, 7.  
 LT.-COL. J. G. CUNNINGHAM, O.B.E., "Northern Whig," 3 Waring Street, Belfast, 1.

## D

THOMAS H. DALY, 16 Cranmore Gardens, Belfast, 9.  
 PROF. O. DAVIES, LITT.D., University of Natal, Pietermaritzburg, South Africa.  
 C. DOUGLAS DEANE, Ulster Museum, Stranmillis, Belfast, 9.  
 LORD DERAMORE, Hezlington Park, York.  
 MISS A. E. DONNELL, 46A Orpen Road, Finaghy, Belfast, 10.  
 MARQUIS OF DOWNSHIRE, Dundrum, Co. Down.  
 T. H. DRUMMOND, 7 Windsor Park, Bangor, Co. Down.  
 DR. J. DUNDEE, The Promenade, Whitehead.

## E

DR. DOROTHY EAGLESON, 18 Malone Hill Park, Belfast, 9,

## F

- JAMES A. FERRY, 7 College Square North, Belfast, 1.  
 ALEX. H. FINLAY, 56 Demesne Road, Holywood..  
 PROF. T. FLYNN, D.SC., c/o Northern Bank, Ltd., Shaftesbury Square, Belfast, 2.

## G

- LT.-COL. A. GARNER, Old Mill House, Helen's Bay.  
 MRS. M. A. K. GARNER, Old Mill House, Helen's Bay.  
 R. G. GORDON, Ballyloran House, Larne.  
 JOHN GRANT, 13 Kingsway Avenue, Belfast 5.  
 M. GRAPES, 591 Upper Newtownards Road, Belfast, 4.  
 E. R. R. GREEN, 192 Wythenshard Road, Manchester, 23.  
 LT.-COL. J. R. H. GREEVES, Altona, Strandtown, Belfast, 4.

## H

- HENRY M. HALL, 32 Nassau Street, Dublin, C.2.  
 T. F. HALL, "Dunedin," 46 Diamond Gardens, Finaghy, Belfast, 10.  
 H. M. HAMILTON, 73 Botanic Avenue, Belfast, 7.  
 MRS. HAMILTON, 73 Botanic Avenue, Belfast, 7.  
 F. W. P. HAMPTON, 15 Cloverhill Park, Belfast, 5.  
 R. H. HARTE, M.A., D.PH., High School, Glenravel Street, Belfast, 18.  
 T. J. HEALY, 3 Kersland Drive, Belfast, 5.  
 H. W. HEARDEN, Fernlea, Beech Hill Road, Newtownbreda, Belfast, 8

## I

- J. H. IRWIN, A.C.I.L., 5 Linenhall Street, Belfast, 2.

## J

- LESLIE J. JOHNSTON, 43 Knock Road, Belfast, 5.

## K

- MRS. C. KENNEDY, 22 Gt. James' Street, Derry City.  
 MR. AND MRS. R. H. KIDD, 166 King's Road, Belfast, 5.  
 MRS. A. KIRBY-SMITH, 11 Herries Road, Oxford.  
 J. M. KNIPE, 36 Lyle Road, Bangor.

## L

- J. F. L. LARMOR, Fairy Hill, Dunmurry.  
 DR. E. LINDSAY, M.R.A.I., The Observatory, Armagh.  
 W. E. LINTON, F.R.G.S., Glen Isla, Whitehead.  
 JAMES LOUGHRIDGE, M.D., F.R.C.S., 26 University Square, Belfast, 7.

## M

- ROBERT MARSHALL, M.D., F.R.C.P., 6 College Gardens, Belfast, 11.  
 CAPT. W. H. MAYES, A.C.A., Glenalla, Circular Road, Jordanstown.  
 L. MITCHELL, Abbey Street, Coleraine.  
 R. A. MITCHELL, J.P., 8 Beechlands, Malone Road, Belfast, 9.  
 DAVID MONTGOMERY, 49 Donegall Place, Belfast, 1.  
 H. H. MONTGOMERY, 4 Kensington Gardens, Belfast, 5,



## Mc

WM. McCAUGHEY, 23 Hawthornden Road, Belfast, 4.  
 JOHN McCOSKER, 5 Knockdarragh Park, Belmont, Belfast, 4.  
 ANDREW MCCOUBREY, B.A., 8 Charnwood Avenue, Belfast, 15.  
 DR A. H. McCREA, U.V.F. Hospital, Craigavon, Belfast.  
 THE VEN. J. R. McDONALD, M.A., The Rectory, Templepatrick  
 REV. P. J. McDOWELL, Airfield House, Glen Road, Belfast, 11.  
 FRANCIS MCGIBBEN, F.C.I.L., 15 Windsor Avenue, Belfast, 9.  
 FRANK McKEE, 16 Donegall Square South, Belfast, 1.  
 R. C. McKIMM, 32 Waring Street, Belfast, 1.  
 A. M. McKISACK, 9 Mount Pleasant, Belfast, 9.  
 LT.-COL. W. McNEILL, M.B.E., Briar Lodge, Cultra, Aberdeenshire.  
 MRS. G. McNEILL, 55 Malone Road, Belfast, 9.  
 MR. J. McNEILL, 55 Malone Road, Belfast, 9.

## N

T. M. NESBITT, 34 Old Cavehill Road, Belfast, 15.  
 WM. NESBITT, 57 Rugby Road, Belfast, 7.

## P

MISS EILEEN PHELAN, B.A., Castle Street, Antrim.  
 V. PRAGNELL, 35 Abbey Park, Belfast, 5.

## R

W. NORMAN ROBB, 8 James' Street, Belfast, 13.  
 THOMAS G. ROE, Greenwood, Victoria Road, Holywood.  
 REV. CANON RUTHERFORD, B.A., 7 Downshire Avenue, Carrickfergus.

## S

ARTHUR SAVAGE, Dangan Lodge, Donaghadee.  
 DR. J. SAYERS, *Belfast Telegraph*, Belfast, 1.  
 E. SHANKS, 7 Norwood Park, Belfast, 4.  
 T. F. SINCLAIR, 78 Trinity Court, Gray's Inn Road, London, W.C.1.  
 R. C. T. SINGLETON, Old Cultra Road, Cultra.  
 MAJOR RUPERT STANLEY, LL.D., 51 Windsor Avenue, Belfast, 9.  
 J. A. S. STENDALL, M.R.I.A., 53 Abbot's Grange, Chester.  
 R. W. M. STRAIN, B.SC., M.D., F.R.C.P.(I.), 9 Broomhill Park, Belfast, 9.  
 R. LESLIE STREIGHT, M.INST.T., 19 Beech Road, Whitehead.

## T

MRS. TAYLOR, 53 Hawthornden Road, Belfast, 4.  
 ROBERT TAYLOR, Glandegu, Magherafelt, Co. Derry.  
 HAROLD THOMAS, M.I.N.A., 19 Holland Park, Knock, Belfast, 5.  
 GEO. B. THOMPSON, M.SC., F.M.A., 30 Tobarcooran Avenue, Glengormley, Newtown-  
 JOHN H. TORNEY, Scadden House, Raholp, Downpatrick.  
 S. TURNER, 142 Barnett's Road, Belfast, 5.  
 FRANCIS TURNLEY, D.L., Drumasloe, Carnlough.  
 abbey.

V

J. W. VITTY, M.A., Linenhall Library, 17 Donegall Square North, Belfast, 1.

W

MRS. R. WAIDE, 38 Haddington Gardens, Belfast, 6.  
 MRS. E. WEBB-SUMNER, 8 Mount Pleasant, Belfast, 9.  
 W. GORDON WHEELER, M.A., Queen's University, Belfast, 7.  
 N. WHITE-BROWNLOW, 2 Windsor Avenue, Belfast, 9.  
 MISS VIOLET WILKINS, 112 Antrim Road, Belfast, 15.  
 H. E. WILSON, M.SC., 28 College Gardens, Belfast, 9.

Y

CAPT. JAMES R. YOUNG, F.R.I.B.A., 15 Chichester Park, Belfast. 15.





## FORM OF BEQUEST

—o—

*I Bequeath out of such part of my personal Estate, as may by Law be bequeathed for such purposes to the Council of the Belfast Natural History and Philosophical Society, the sum of\* free from Legacy Duty, for the general purposes of the said Belfast Natural History and Philosophical Society of the said City, to be expended in such ways as may deem expediency and I direct that the receipt of the Hon. Treasurer for the time being of the said society shall be an efficient discharge of the said Legacy.*

*\*Or Specimens of Art, Antiquities, Natural History or Books.*

*NOTE.—Land or other Personal Estate may also be given by Deed or Will, to be applied for the purposes of the Belfast Natural History and Philosophical Society, provided that the Deed or Will, as the case may be, be executed not less than three calendar months before the death of the Donor, and that every Deed or Instrument, not being a will, shall be duly registered in the Office for Registering Deeds in the City of Belfast within three calendar months after the execution thereof.*









